Control of Emissions from Marine SI and Small SI Engines, Vessels, and Equipment

Summary and Analysis of Comments

United States
Environmental Protection
Agency

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Assessment and Standards Division
Office of Transportation and Air Quality
U.S. Environmental Protection Agency

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1 Rulemaking Process and Cross-Program Issues

What We Proposed:

The comments in this section generally correspond to Sections I, II, VIII, IX, XI, XII, XIII, and XIV of the preamble to the proposed rule, where we give an overview of the rulemaking, describe the process for public participation, and detail a range of technical amendments that apply to programs other than those that are the focus of the proposed emission standards. The applicable regulatory provisions for cross-program issues are in 40 CFR parts 1027, 1065, 1068, and 1074. In addition, we proposed technical amendments to specific programs in 40 CFR 89, 90, 91, 94, 1033, 1039, 1042, 1045, 1048, 1051, 1054. The Regulatory Impact Analysis describes the calculated air quality and benefits associated with the proposed standards in Chapters 2 and 8, respectively.

1.1 General input

1.1.1 Broad support and general observations

What Commenters Said:

EMA commented that it has been an active participant in the development of the NPRM for the next-phase Small SI engine standards. Specifically, EMA has worked to help EPA staff determine: (i) the most effective exhaust emission control technologies that could be applied to Small SI engines; (ii) the most effective evaporative emission control technologies that could be applied to Small SI engines and the equipment that they power; (iii) limitations on the applicability of such emission control technologies to Small SI engines and the equipment that these engines power; and (iv) the optimized timeline for deploying the available emission control technologies into the marketplace. The net result of that collaborative process is an NPRM that truly and properly reflects the maximum achievable emission reductions for Small SI engines and the equipment that they power. In that regard, EMA greatly appreciates the time and effort that have gone into the development of the pending rulemaking -- a rulemaking that has set forth extremely challenging and dramatic, but nonetheless potentially achievable, emission reduction targets. Indeed, the effort that has gone into this collaborative rulemaking has resulted in the promulgation of an overall framework of technology-forcing standards and accompanying regulations that are at the very limit of feasibility and implementability. As a consequence, that overall framework needs to be maintained in any final rule that results from the NPRM, since any potential increased stringency of the proposed standards or the overall regulatory program would necessarily result in an infeasible and nonimplementable rule.

EMA continued to comment that the NPRM properly recognizes the inherent constraints on the transfer of advanced exhaust emission control systems to Small SI engines, and appropriately limits the efficiency of the required aftertreatment to achieve the proposed standards to those levels that can be effectively implemented taking into consideration, among other things, noise and safety. Similarly, the NPRM properly recognizes that evaporative emission control of Small SI engines and the equipment these engines power may involve the engine manufacturer, the equipment manufacturer, or the component supplier. Accordingly, EMA supports the overall framework of the NPRM, and urges EPA to finalize a rule that preserves that framework in order to maintain the feasibility of the pending rulemaking.

EMA generally supports the NPRM's approach to the certification process and the standardization of testing requirements. Certification is critical to the creation of a level playing field. Manufacturers must have confidence that all competitors are required to meet the same requirements, and are subject to the same liabilities with respect to emission related product performance and warranty. Approved alternate test procedures must be available for all manufacturers without subsequent approval. EMA recommends that approved alternative procedures for emission testing, both exhaust and evaporative, and exhaust emission deterioration factor determination be documented and posted on the EPA website for all manufacturers to see and use. In addition, EMA has the following specific concerns with respect to the NPRM's proposed certification and testing requirements that should be resolved in the final rule. (see section 1054.245(b)(9)).

EMA commented on §1065.12 "Approval of alternate procedures." that approved alternate test procedures must be available for all manufacturers without subsequent approval. EMA recommends that approved alternative procedures be documented and posted on the EPA website for all manufacturers to see and use.

Kohler Co. is committed to participating with government and regulatory agencies in the development of responsible environmental law and regulations. Kohler believes in harmonizing, to the greatest extent possible, the EPA Phase 3 regulation with the California Tier III regulation. A 50-state regulation is in the best interest of the industry and the Phase 3 regulation reasonably balances the benefit to the environment with the additional product costs of compliance. Kohler believes the resulting compliant product will perform satisfactorily in every way, including safety. Kohler agrees with the overall framework of the NPRM for Phase 3 regulations and has participated in and publicly supported EPA's efforts in developing the Phase 3 regulation. However, Kohler has some concerns with the details of the regulation. There are a few aspects of the regulation on which Kohler feels compelled to provide additional comment. These include: determining engine displacement for the LSI exemption, exhaust emission calculations, transparency of approved alternative emission test cycles, allowable maintenance for DF testing, and record keeping/reporting.

NMMA commented that its members are supportive of EPA's proposal to control evaporative and exhaust emissions from marine SI engine s and fuel system components. NMMA members are committed to producing environmentally responsible products. Over the years, the recreational marine industry has devoted significant time and resources to ensure that they are in compliance with all applicable federal environmental and safety regulations as well as recommended industry "best practices" and standards. NMMA also has worked closely with EPA on the implementation of several important regulatory programs, including this current proposal. With all of these rulemakings, NMMA has appreciated EPA's willingness to consider additional information and data from NMMA members and work collaboratively with the recreational marine industry to address concerns which the industry has had with the specifics in these rulemakings.

Indmar commented that they support the proposed federal emission regulations for new marine spark-ignited sterndrive/inboard engines that will substantially reduce emissions from these engines. There are a few areas that they would suggest alternative language or changes. Indmar Products supports the enactment of the proposed Federal sterndrive/inboard exhaust emissions standards with the noted changes.

Overall, BRP commented that they are supportive of EPA's proposal to control evaporative and exhaust emissions from marine SI engines and fuel system components and to the revisions of the regulations impacting off-road recreational vehicles and engines. Over the years, BRP has devoted significant time and resources to ensure compliance with all applicable federal environmental and safety regulations as well as recommended industry "best practices" and standards. BRP also has worked closely with EPA on the implementation of several important regulatory programs, including this current proposal. With all of these rulemakings, they have appreciated EPA's willingness to consider additional information and data.

Mercury Marine supports EPA's proposal to control evaporative and exhaust emissions from marine SI engines and fuel system components. They are committed to producing environmentally responsible products. Over the years, the recreational marine industry has devoted significant time and resources to ensure that they are in compliance with all applicable federal environmental and safety regulations as well as recommended industry "best practices" and standards. Mercury Marine has worked closely with EPA on the implementation of several important regulatory programs, including this current proposal.

Mercury Marine has a few remaining concerns regarding the technology, timing, and implementation required by the proposal. Catalysts and low permeation hoses are available and can be incorporated into marine exhaust and fuel systems. However, there are market issues, some that are out of their control, that have an impact on our abilities to meet some of the proposed standards in the proposed timeline. Therefore, they will propose alternatives to the items they have issues on that will provide EPA with emissions reductions but maintain their business, customers, and employees. If the issues they have raised in these comments are adequately addressed, then Mercury Marine fully supports this rule.

Yamaha is supportive of EPA's proposal with the addition of NMMA industry comments to control evaporative and exhaust emissions from Marine SI engines and fuel systems components. Over the past many years Yamaha has worked closely with the EPA on other rulemakings for motorsports products on both evaporative and exhaust emission controls. With all these rulemakings Yamaha has appreciated EPA's willingness to consider additional information and data from Yamaha and work with the industry to address concerns and issues relative to specifics in these rulemakings. It is Yamaha's position that although this proposal is very comprehensive and they are in general agreement with its intent, however there are still a few remaining concerns outstanding that need to be addressed regarding technology availability and implementation timing of this proposal. As they hope, these comments along with those submitted with their approval of the NMMA will demonstrate the need for additional lead time to design, manufacture and implement effective controls for exhaust and evaporative emissions.

Yamaha also will offer comments on other aspects of the proposal in regards to certification, ABT and compliance test protocols.

Volvo Penta commented that “care for the environment” is a core corporate value of the entire Volvo Group, including Volvo Penta. Volvo Penta supports EPA’s proposal to control exhaust emissions from SD/I engines, and has been committed to producing environmentally responsible products. Over the years, Volvo Penta has devoted significant time and resources to ensure their products comply with all applicable federal environmental and safety regulations as well as recommended industry standards. During the past several years, Volvo Penta has worked closely with the National Marine Manufacturers Association (NMMA) and the EPA to craft a workable solution to emissions concerns. Throughout this process, Volvo Penta has appreciated EPA’s willingness to consider additional information and data from the industry. These collaborative efforts have reduced industry concerns regarding the proposed rule. The comments included reflect the Volvo Penta's few remaining issues of concern:

Euromot commented that they have reviewed the proposed Phase 3 regulation within their membership and they fully support the OPEl comments. As established manufacturers with a long compliance history they understand the new concept of EPA for imports (and exports). The changes proposed by the OPEI comments are essential for the Euromot members to be present on the market in the future. Without these changes the regulation would be not practical and a dramatic burden (financial and administrative) would be laid to the industry.

In a public hearing, Ilmor stated that broadly speaking, Ilmor supports the proposed EPA Rule.

Pleasurecraft Marine commented in a hearing that their company is fully supportive of emission reductions and is working diligently to solve the many complex technical and implementation issues associated with manufacturing a catalyst controlled engine. They would like to thank the EPA for their insights in crafting a document that, with minor changes, will be of great benefit to our industry, the boating community and the environment.

Brunswick supports EPA's efforts of improving the environment through cleaner products.

Inca does support the need for control of evaporative emissions through low permeation fuel tanks, diurnal emission controls, and low permeation hose. However, due to the direct correlation their products have with boating safety they want to be sure that the requirements of this standard do not create a low emission product that is inferior in quality to the current product that has been successful in the marine industry for years.

Heraeus commented that their small engine solutions provide a variety of different catalyst solutions. They provide effective conversion of the bad stuff coming out of the engine. They have catalysts which match the durability needed, in other words, addressing the DF factor for the engine application. And an engine exhaust catalyst is really quite a cost-effective approach. They support the proposed EPA Phase 3 emissions regulations for Class I and Class II nonroad spark-ignition engines. Heraeus is ready and believes this rule should be finalized as soon as possible.

MeadWestvaco Corporation supports the EPA's proposal to control evaporative emissions from marine SI engines and fuel system components and is committed to providing products used to control these emissions.

NACAA strongly supports prompt EPA action to reduce emissions from these sources. They believe this long-awaited proposal – which includes HC, NOx, and carbon monoxide (CO) exhaust emission standards, as well as evaporative emission standards – is a critically important step forward.

EVCC commented that as their technology has proven reductions in HC+NOx of up to 98.9% on a two-stroke engine and 90% on a four-stroke engine (while also significantly reducing CO), they are not only in full support of the current regulations, but they encourage our organizations to set even more stringent standards in the near future.

Ozone Transport Commission (OTC) and Maryland support the EPA's effort to regulate emissions from nonroad spark-ignition engines, vessels, and equipment. OTC has anticipated the EPA's proposed regulation. In a March 14, 2006 letter to the EPA Administrator several Midwest and OTC states urged the EPA to promulgate the regulations for nonroad spark-ignition engines. As the letter stated, this source category "has the potential to provide very significant reductions." Additionally, the OTC adopted Resolution 06-02 on June 7, 2006 requesting that EPA develop and implement a strong national program reflecting current technology advancements regarding small engine emissions. The OTC is encouraged by the May 18, 2007 proposal.

NESCAUM (Northeast States for Coordinated Air Use Management) submitted comments on EPA's Proposed Rule for Control of Emissions from Nonroad Spark-Ignition (SI) Engines and Equipment commending EPA and strongly supporting the goals of this rulemaking effort. NESCAUM is an association of state air pollution control agencies in Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont.

The Mid-America Regional Council (MARC) Air Quality Forum, created in accordance with Section 174 of the Clean Air Act to coordinate the development and implementation of air quality policy in the bi-state Kansas City region, wishes to express its strong support for EPA's proposal to set federal emissions standards for small spark-ignition engines. The public health impacts of ground-level ozone and fine particulates are well documented, and to the extent that the proposed rule will lead to significant and measurable reductions in both pollutants nationally, they urge EPA to implement the small engine rule as expeditiously as possible.

The California Air Resources Board (California ARB) commented that the federal Clean Air Act (CAA) Amendments of 1990 preempt California from controlling emissions from new farm and construction equipment under 175 horsepower (hp). Because of this preemption, significant emissions from these engines are beyond California ARB's authority to regulate, and California ARB must rely on EPA to establish regulations. Furthermore, it is important that EPA also adopt more stringent emission standards for nonpreempted engines, such as those used in marine applications. Federally certified engines used in marine vessels can be used in California which could impact California's ability to meet clean air goals. Adoption of the proposed regulation outlined in the proposed rule by EPA is necessary for the protection of public health in California and to comply with air quality standards. New stringent and cost effective standards should be adopted for these categories in a timely manner to ensure that the cleanest engines and equipment be introduced into the fleet at the earliest possible date. In general, California ARB supports the direction that EPA is taking to control emissions from nonroad spark-ignition engines and equipment included in this notice of proposed rulemaking (NPRM).

The South Coast Air Quality Management District (SCAQMD) staff appreciates this opportunity to provide formal comments on the proposed regulation for Nonroad Spark- Ignition Engines and Equipment. Although they commend the EPA's efforts in developing this proposal, the SCAQMD staff believes that the proposed regulations must be further strengthened in order for California and in particular, the South Coast Air Basin, to meet applicable federal fine particulate matter (PM2.5) and 8-hour ozone air quality standards in an expeditious manner.

The NJDEP supports the adoption of federal emission standards, which are consistent with standards adopted by California ARB. With respect to the implementation dates, the NJDEP encourages expeditious implementation of the federal standards and requests that the implementation dates be advanced to align more closely with the implementation dates established by California ARB.

Wisconsin DNR commends EPA for its leadership in issuing this proposed rule and seeking comments on the merits of better emission standards. They support EPA's proposal to set stringent emission standards for new nonroad spark-ignition engines, equipment, and vessels. Emissions from the engines covered by this proposal are substantial that contribute to unhealthful concentrations of PM, ozone, CO, and toxic air pollutants, which translate into serious adverse health impacts. The proposal would significantly reduce harmful exhaust emissions as well as evaporative emissions from these sources – which include HC, NOx, and CO.

New York State DEC supports EPA's proposal to set stringent emission standards for new nonroad spark-ignition engines, equipment, and vessels. Emissions from the engines covered by this proposal are substantial that contribute to unhealthful concentrations of PM, ozone, CO, and toxic air pollutants, which translate into serious adverse health impacts. The proposal would significantly reduce harmful exhaust emissions as well as evaporative emissions from these sources – which include HC, NOx, and CO.

New York State DEC continued to comment that the importance of reducing emissions from small spark-ignition engines used in applications such as lawn and garden equipment, and recreational marine emissions, cannot be overstated. Most of the operation of these engines occurs during warm weather conducive to the formation of ground level ozone, and their ozone precursor emissions are poorly controlled compared to other classes of engines and vehicles. Even with the proposed standards, an hour of operation of these engines will yield hydrocarbon and oxides of nitrogen emissions comparable to driving an average (Tier 2 Bin 5) new light duty vehicle hundreds, in some cases thousands, of miles. Indeed, it is likely that many households produce more ozone-forming emissions maintaining their lawn than commuting to work. Considering the comparatively high emissions levels of these engines, and their increasing importance to emission inventories, we believe that additional future reductions are necessary. The Department urges EPA to continue its efforts to identify emissions control technology that achieves emission reductions beyond what is currently proposed.

New York State DEC continued to comment that although the standards proposed by EPA provide significant and necessary reductions in ozone forming emissions from small land based engines and recreational marine engines, these engines will still be relatively poorly controlled compared to other mobile sources. These engines will still emit ozone precursors out of proportion to their numbers and hours of operation. The disproportionate emissions levels of these engines compared to passenger vehicles shows that there is a need for more stringent standards than the ones currently proposed. EPA research into nonroad spark-ignition engine emissions control is crucial to identifying available technology which can achieve a greater degree of emissions reductions. In particular additional work is needed to facilitate the application of catalysts to outboard and personal watercraft engines, many of which are automotive sized. They urge EPA to continue its efforts in this field, and build on its current success, ultimately promulgating more stringent regulations for all of these classes of nonroad engines.

Pennsylvania DEP strongly supports EPA's action, but offers additional recommendations to strengthen the final regulation. While DEP strongly supports EPA's proposed action to reduce emissions from small land-based and marine spark-ignition engines, equipment, and vessels, and urges EPA to promulgate the final rule as soon as practicable, DEP understands and acknowledges that certain aspects of the proposed rulemaking were delayed by further study mandated by law and that Congress has also expressly precluded states from taking any action more stringent than EPA's on small spark-ignition engines. Therefore, DEP urges EPA to ensure that the final rule is fully implemented expeditiously to achieve the greatest degree of emission reductions.

The Houston-Galveston Area Council (H-GAC) Board of Directors would like to offer general support and comments for the Environmental Protection Agency proposed rule. They greatly appreciate the efforts of the EPA to draft this proposed rule, which targets several of these mobile sources for significant emission reductions that could not otherwise be achieved.

Johnson County, Kansas commented that they are in full support of the proposed regulations on nonroad motor engines. In an effort to lower harmful ozone causing emissions such as those spewed from lawn equipment, they find the proposed standard to be an effective step in improving the health of our social and biotic communities.

Clean Air Watch commented that smog is a serious public health problem: technically known as ozone, smog can cause asthma attacks among children and adults, send people to hospital emergency rooms, and reduce a person's lung capacity. It has even been linked to premature death. The evidence is quite clear that even though we have reduced air pollution through other Clean Air Act standards, such as those for motor vehicles, we still need to make further progress to protect breathers. Just last Saturday, the Washington Post reported on continuing air pollution problems in the Washington, D.C. area. And our Clean Air Watch surveys verify that similar problems persist in many states. Clean Air Watch continued that EPA's independent science advisers and the agency's own scientists have concluded that existing air quality standards for smog must be made stricter to protect kids with asthma and others. As we clean up cars and trucks, small engines are an increasingly large part of the pollution problem. Cleaning them up absolutely must be part of the solution. EPA’s proposed standards are a good step in the right direction. Clean Air Watch commented that it would be better for air quality if they could take effect sooner. They hope we will resist any effort to delay or weaken these standards. They believe EPA's detailed studies have put to rest concerns previously raised about safety. So they encourage EPA to move forward and issue these standards in final form this year.

Environmental Defense strongly supports the immediate issuance of a final rule to control air pollution from spark-ignition marine and small engines in light of the serious public health and welfare problems posed by the exhaust and evaporative emissions from these engines. They believe a final rule that reflects, or is more protective than, the timing and level of reductions currently required by California ARB is achievable, cost-effective and necessary to protect human health and the environment.

N. Leggett offered support of the concept of requiring pollution control technology for spark-ignited engines. However, some fine tuning of the proposed regulations is needed to prevent the regulations from inhibiting progress in the invention of new technology and the training of technologists.

R. Keichline is supportive of the new legislation to reduce air emissions.

A. Swanson commented on a recent EPA air emissions proposal (Docket ID No. EPA-HQ-OAR-2004-0008). The commenter supported the proposal to: a) increase exhaust emission standards for marine spark-ignition engines and small land-based nonroad engines, b) establish new evaporative emission standards for equipment and vessels using these engines. This proposal is reasonable, for these standards would apply only to newly manufactured products, and it would reduce the harmful health effects of ozone and carbon monoxide from these engines, equipment, and vessels if implemented. Thank you for the opportunity to comment, and the commenter hopes that these reasonable regulations will be finalized and implemented in a timely manner.

T. Nixon commented in full support of this, and only wishes it could be implemented sooner. Much small-engine equipment is not needed for businesses or vital household needs, they are luxury goods that contribute to sound and air pollution in recreational and residential areas. The commenter believes that reducing emissions from watercraft will help make boating more pleasant and enjoyable, and these regulations should certainly help clear the air for people in dense urban areas. If higher costs do reduce sales, it may further serve to increase the health of the nation by having people use push-mowers instead of ride-on mowers, and rakes instead of leaf-blowers. Although, admittedly, increased use of snow shovels (vs. snow blowers) could actually reduce health, as that can be back-breaking work. Good luck getting these new emissions regulations (or some version of them) implemented.

B. Paddock commented that the regulatory analysis persuades the commenter that there are substantial benefits to the human environment to be obtained by adoption of the proposed rules on small engine emissions. The commenter urges EPA to advance the effective date and deadline for implementation of the regulations. These improved products can be built with existing knowledge and technologies as is evident from products sold in California. Low emission mowers and other products should be made available throughout the U.S. at the earliest possible date. The years of delay in the implementation of rule are unnecessary. As a consumer, the commenter wants to buy emissions reduced products now. The cost of gasoline means the commenter will recover the costs of fuel efficiency (and reduced emissions) in a shorter time. Lawn mowing is becoming unaffordable. Coupled with drought and native plant landscaping, the mower industry is likely in for slow period. New, fuel efficient, "greener" low emission mowers offer a reason to buy sooner rather than wait for years for a better product. The same is true for boat motors. The manufacturer who first makes rule compliant products available will see a surge of sales.

Nautigaz commented in their first e-mail that it was for them very good news, it is it for several reasons. Of course they hope to be able to work now, thanks to these new standards, but they also hope to bring a solution which goes in the "direction of the History." If all is not perfect in the USA, they reassure in France it is exactly similar! It is perhaps why our countries are friendly since the Lafayette General.

The Environmental Club of Colorado State University – Pueblo commented that they are overwhelming glad to see that new regulations are going to be implemented restricting air pollutants from lawn mowers and small boat engines. They are very glad that these new regulations are coming to pass. However, they believe that the dates which these regulations will go into effect are too far out. They believe it is more than possible to lessen the period of time until these regulations take effect. Please consider enacting these regulations much sooner, as our Earth desperately needs clean air as do we all.

Letters:

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Our Response:

We appreciate all comments on the proposed rule; specific responses to the various concerns raised by individual commenters are in the rest of this Summary and Analysis of Comments document.

1.1.2 Legal authority

What Commenters Said:

NACAA commented that emission control requirements for small nonroad spark-ignition and marine spark-ignition engines and equipment should achieve the greatest reductions feasible as soon as possible. In Section 101(a)(3) of the Clean Air Act, Congress vests state and local clean air agencies with "primary responsibility" for the control of air pollution. This is a responsibility they take very seriously. As NACAA seeks to achieve and sustain clean, healthful air throughout the country, they must consider the full measure of emission reductions feasible from every source of pollution as quickly as possible. With respect to nonroad spark-ignition engines smaller than 50 horsepower, however, states and localities other than California, very unfortunately, are preempted from adopting standards or other requirements. Therefore, it is incumbent upon EPA to ensure that this rule achieves the greatest degree of reductions possible as soon as possible.

Environmental Defense commented that Congress is concerned about the air pollution caused by nonroad mobile sources such as the spark ignition marine and small engines subject to this rule, they enacted § 213 as part of the Clean Air Act amendments of 1990. See Pub. L. No. 101-549 § 222, 104 Stat. 2399, 2500-02 (1990) (codified at 42 U.S.C. § 7547). Section 213 instructs EPA to set emission standards for nonroad engines that reflect the "greatest degree of emission reduction achievable". 42 U.S.C. § 7547(a)(3). For this reason, the D.C. Circuit consistently has held these provisions of the CAA to be "technology-forcing." Husquvarna AB v. EPA, 254 F. 3d 195, 200 (D.C. Cir. 2001) (upholding EPA decision to give priority to goal of reducing emissions, over cost, noise, energy and safety factors in setting Phase 2 emission standards for handheld small engines); see also NRDC v. EPA, 655 F.3d 318, 328 (D.C. Cir. 1981) (stating that the legislative history of the CAA demonstrates that Congress intended EPA to "press for development and application of improved technology rather than be limited by that which exists today.") Importantly, Section 213 also directs EPA to set emission standards that: shall take effect at the earliest possible date considering the lead time necessary to permit the development and application of the requisite technology, giving appropriate consideration to the cost of compliance within such period and energy and safety. 42 U.S.C. § 7547(b). Whether a particular standard satisfies both statutory prongs of Section 213, therefore, involves a question of stringency as well as timeliness. See e.g. Bluewater Network v. EPA, 370 F.3d 1, 21-22 (D.C. Cir. 2004). Clearly, if EPA were to set standards reflecting the "greatest degree of emission reduction achievable" based on technology available in 2007, but not implement such standards until much later, the actual emission reductions resulting from such rules would be minimal, at best. Such standards, even though technology-forcing in 2007, would likely lag behind the technological advances made in the interim years between the initial proposal and the ultimate implementation date. Consistent with the statutory mandate to implement emission standards "at the earliest possible date", EPA must "provide a reasonable explanation of the specific analysis and evidence upon which the Agency relied." Id. at 21. Anything short of this fails the arbitrary and capricious test applied to EPA rulemaking under the CAA and APA. See Motor Vehicle Mfrs. Assn. v. State Farm Mut., 463 U.S. 29, 52 (1983).

Letters:

Commenter	Document #
Environmental Defense	0648
NACAA	0651

Our Response:

We understand these comments to be generally reinforcing the statutory provisions upon which we based our proposed rule. See the preamble to the final rule and the rest of this document for a description of specific issues related to the timing and feasibility of implementing standards that we believe represent the greatest degree of emission reductions that are achievable at this time.

1.1.3 Process concerns

What Commenters Said:

Environmental Defense commented that most importantly, they believe EPA must act expeditiously in publishing and implementing final rules for these SI engines. Indeed, they believe EPA has already acted unlawfully and in violation of its statutory duties under the Clean Air Act (CAA) and other laws due to the amount of time that has passed since Congress required the Agency to reduce emissions from these engines.

Houston-Galveston Area Council (H-GAC) commented that due consideration should be given to the economic impacts of this rule, particularly on small businesses; however, H-GAC believes that these concerns should not outweigh the more primary concerns of protecting the public health and achieving Clean Air Act compliance. They therefore encourage the EPA to finalize these emission standards before the end of this year at the most stringent levels that are technically feasible to achieve the maximum environmental benefit. H-GAC encourages the EPA to implement the standards as quickly as it is possible to do so, but no later than 2009. This would provide the maximum benefit to their region's air quality improvement efforts.

EMD urges EPA not to do what it has done here – to include in a proposed rule items that are unconnected, or only peripherally connected, to the subject of the rulemaking. The current proposal includes new proposed rules on certification fees and on preemption provisions that are only marginally connected to the spark-ignition engines and equipment that are the main subject of the proposal. The included items are not even listed in the title of the rule proposal. EPA's practice here makes life difficult and increases expense for regulated parties. All manufacturers must read carefully every EPA proposed rule, including those seemingly unrelated to their products, to make sure that EPA has not piggybacked provisions important to their markets on them. EPA should make proposals such as the certification fees rule and the preemption rule the subjects of separate rulemakings, with their own entries in the Federal Register. There is precedent for such an action; for example, the original rule proposal extending certification fees to nonroad engines 17 stood alone, and was not piggybacked on another rule proposal.

ASTM commented that the following standards referenced have been updated: D 471-98 is now D 471-06; D 323--99a is now D 323-06; E29-93a is now E29-06b. If EPa would like copies of the updated standards, they would be happy to send them.

Letters:

Commenter	Document #
EMD	0687
ASTM	0606
Houston-Galveston Area Council	0633
Environmental Defense	0648

Our Response:

The comments from Environmental Defense summarize the position they took in litigation regarding the applicability of the original statutory deadline for completing this rulemaking. The district court decision upheld EPA's position that the original deadlines no longer applied once Congress adopted a separate requirement to publish a safety study related to the safety implications of new emission standards before proposing such standards (in the docket under EPA-HQ-OAR-2004-0008-0840). Environmental Defense has appealed this decision. We continue to believe that we have not acted unlawfully in completing this rulemaking. While we have worked diligently to complete the rulemaking as quickly as possible, addressing a wide range of technical issues required substantial time and interaction with many interested parties. We believe the result of all of these efforts is a rule that is thorough and effective in achieving our objectives.

We share the perspective of the Houston-Galveston Area Council that the rule should achieve emission reductions to protect public health and meet our statutory obligations while taking into account the particular concerns for small businesses that must meet new requirements. We believe the final rule achieves this balance by including far-reaching emission standards in combination with a variety of provisions to address concerns related to compliance burdens for small businesses. The timing of the final rule is somewhat behind the schedule envisioned at the time of the proposal, but we are able to preserve the most important portions of the implementation schedule described in the proposed rule.

We understand the concerns raised by EMD, however we do not believe they are sufficient to justify excluding the issues from this rulemaking. The inclusion of such broad issues is this rulemaking is appropriate, especially under the new "plain-language" regulatory construct, which allows the use of common procedures across multiple categories. All changes to these common regulations are made through public rulemakings such as this. In addition, we made great efforts to reach out to all affected stakeholders in such rulemakings.

ASTM has further updated its standards beyond the changes described in its comments on the proposed rule. We have included the latest ASTM standards for every reference and appreciate ASTM's eager cooperation in supporting this effort.

1.1.4 Commenters referencing other commenters

What Commenters Said:

Euromot reviewed the proposed Phase 3 regulation within their membership and they fully support the OPEl comments. As established manufacturers with a long compliance history Euromat understands the new concept of EPA for imports (and exports). The changes proposed by the OPEI comments are essential for the Euromot members to be present on the market in the future. Without these changes the regulation would be not practical and a dramatic burden (financial and administrative) would be laid to the industry.

Honda commented that they are a member of the Engine Manufacturers Association (EMA), Outdoor Power Equipment Institute (OPEI), and the National Marine Manufacturers Association (NMMA) and supports the comments submitted by each of these trade associations.

Kohler is a member of the Engine Manufacturer Association (EMA) and the Outdoor Power Equipment Institute (OPEl) and as such supports the written comments being submitted by them.

Arctic Cat is in full support of comments from MIC and ISMA and have no intention of diminishing the importance of additional issues raised by either association by not including specific comments here.

BRP supports the comments submitted by the National Marine Manufacturer's Association (NMMA), International Snowmobile Manufacturer's Association (ISMA), and the Motorcycle Industry Council (MIC). In addition, BRP has individual comments on certain aspects of this regulation which could not be addressed through these organizations. Detailed is a summary of these comments along with additional information to support the NMMA, ISMA, and MIC comments.

Yamaha is supportive of EPA's proposal with the addition of NMMA industry comments to control evaporative and exhaust emissions from Marine SI engines and fuel systems components. As they hope, these comments along with those submitted with their approval of NMMA will demonstrate the need for additional lead time to design, manufacture and implement effective controls for exhaust and evaporative emissions.

EMD has read, agrees with, and supports the comments to be submitted by the Association of American Railroads. They urge EPA to act in accordance with those comments.

Heraeus is very supportive and a member of OPEI Fuel and Exhaust Clean Air Act Committee. Heraeus is also a member of MECA with membership and workshop participation.

OTC and Maryland commented in finalizing this rule. OTC advises EPA to examine closely the recommendations made by the Northeast States for Coordinated Air Use Management (NESCAUM) and the National Association of Clean Air Agencies (NACAA). The recommendations made by these organizations will improve upon EPA's proposal and offer states much needed reduction in ozone forming precursors.

The Mid-America Regional Council (MARC) Air Quality Forum, created in accordance with Section 174 of the Clean Air Act to coordinate the development and implementation of air quality policy in the bi-state Kansas City region, wishes to express its strong support for the EPA proposal to set federal emissions standards for small spark-ignition engines. MARC also shares some concerns raised by the National Association of Clean Air Agencies (NACAA) in its June 5, 2007, testimony to EPA.

The NJDEP supports the comments submitted by the National Association of Clean Air Agencies (NACAA) and the Northeast States for Coordinated Air Use Management (NESCAUM) for the proposed rule.

Pennsylvania DEP concurs in the technical recommendations made by the National Association of Clean Air Agencies (NACAA).

The comment from the Natural Resources Defense Council related to federal preemption of state regulation was co-signed by representatives of Environmental Defense, Friends of the Earth, and Coalition for Clean Air.

Letters:

Commenter	Document #
EMD	0687
Arctic Cat	0709
OTC	0678
Maryland	0722
NJ DEP	0710
NRDC	0690
Bombardier	0674
Yamaha	0721
The Mid-America Regional Council (MARC) Air Quality Forum	0696
Honda	0705
Euromot	0649
Pennsylvania DEP	0676
Kohler	0703
Heraeus (hearing)	0642

1.2 Scope

1.2.1 Handheld exhaust standards

What Commenters Said:

MECA noted that EPA chose not to consider any change in the current Phase II exhaust emission limits for Class III, IV, or V engines used typically on handheld equipment (e.g., chainsaws, string trimmers, hedge cutters). They commented that catalysts are already being used in many (but not all) of these handheld equipment applications. However, engine technology improvements continue to be made on these small spark-ignited engines to further improve engine-out emission characteristics. MECA believes that it is time for EPA to assess the need for further emission reductions from these smaller engines based on the application of advanced engine technologies with properly engineered and cost effective exhaust emission controls like catalyzed mufflers.

NESCAUM also noted that EPA has declined to establish more stringent exhaust emissions standards for handheld equipment beyond the Phase II standards adopted in 2000. The Phase II standards were affirmed by EPA in 2004, based on a technology review, with the final standards taking effect in 2007 for all handheld engine classes. According to the technology review, EPA determined that handheld engines would meet the exhaust emissions standards on schedule, mostly by modifying two-stroke designs to incorporate stratified scavenging with lean combustion, with or without catalytic aftertreatment. Accordingly, NESCAUM fails to see why HC+NOx exhaust emissions standards for Class V handheld engines should remain 44 percent higher than the standards for smaller handheld engines. Their concern is heightened under this proposed rulemaking because, in effect, the Class V engine category will be expanded to incorporate all Class I engines with cylinder displacements less than 80 cc, regardless of whether these engines are used in handheld or nonhandheld applications. While NESCAUM does not object to treating these smaller Class I engines in all respects as Class V engines, they urged EPA to revisit and strengthen the Class V exhaust emissions standards through this rulemaking.

NESCAUM commented that at the time of EPA's technology review in 2004, manufacturers were concentrating their Phase II development efforts on Class IV and smaller displacement engines because these standards were to take effect two years ahead of the Class V engine standards. The speculative concerns regarding technology transfer, safety, performance, weight, and other factors affecting Class V engines were primarily due to the fact that manufacturers had not begun to focus their attention on this particular engine category. EPA's subsequent Technical Study, while confined to larger Class I and to Class II engines, has since established that catalysts can be effectively incorporated into larger engine designs and function without causing some of the problems envisioned by the manufacturers. In addition, NESCAUM noted that at least one equipment manufacturer, Stihl, already has a line of professional grade chainsaws on the market that uses the smaller Class I (soon to be Class V) engines, incorporating stratified scavenging technology and/or catalytic converters to meet emissions standards. They see no basis for allowing Class V engines to certify to the most lenient HC+NOx exhaust standards among small SI engines and therefore urge EPA to adopt more stringent standards. At a minimum, NESCAUM commented that Class V engine standards should be aligned with those for smaller engines. In addition, they urged EPA to update its technology review of exhaust emissions standards for Class III and IV engines, and as necessary, adopt more stringent standards through subsequent rulemaking.

NY DEC noted that EPA's proposal contains no new standards for engines in handheld equipment, where the proximity of engine exhaust to the operator's breathing space leads to individual toxic exposure concerns in addition to ambient air quality concerns. They commented that additional effort is necessary to identify technology supporting more stringent handheld engine regulations. They urged EPA to continue its efforts in this field, and build on its current success, ultimately promulgating more stringent regulations for all of these classes of nonroad engines.

Letters:

Commenter	Document #
MECA	0668
NESCAUM	0641
NY DEC	0659

Our Response:

In response to the comments that EPA should adopt more stringent emission standards for handheld engines, EPA believes the current Phase 2 standards are the appropriate standards for handheld engines at the current time. In fact, the Phase 2 standards for handheld engines are not yet fully phased-in. For Class III and IV engines, the Phase 2 standards became fully effective, including small volume engine families, in 2007. For Class V engines, the Phase 2 standards became effective in 2007 except for small volume engine families. However, small volume engine families in Class V, which include about half of the Class V engine families, have until 2010 to comply with the Phase 2 standard. Therefore, most of the handheld engine manufacturers are still in the process of redesigning the remaining small volume engine families to meet the Phase 2 standards.

An analysis of the certification data for 2008 model year handheld engines shows that the standards have resulted in widespread use of catalysts on Class III and IV engines, as expected in the final rule. Based on sales estimates, approximately 70% of Class III and IV engines are using catalysts to demonstrate compliance with the Phase 2 standards. (The remaining engines are either 4-stroke engines which can meet the standards without a catalyst, or 2-stroke engines without a catalyst many of which are certified through the use of ABT credits and emit at levels higher than the Phase 2 standard.) In addition, the 2008 certification data shows that few of the Class V engines are using catalysts to demonstrate compliance with the Phase 2 standards, as expected in the final rule. (EPA's certification data can be found on the internet at the following address: http://www.epa.gov/otaq/certdata.htm#smallsi) As detailed in the development of the Phase 2 standards, EPA set the Class V standard at 72 g/kW-hr in response to concerns over heat issues related to the use of catalysts since much of the Class V equipment is used in chainsaws where compact packaging requirements make it hard to design the engine with the increased cooling needed with a catalyst (see 65 FR 24269, April 25, 2000). In response to the comment that the recent testing of catalyst-equipped engines by EPA shows catalysts could be incorporated into larger engine designs and function "without causing some of the problems envisioned by the manufacturers," EPA notes that the testing was performed on Class I and II nonhandheld engines which are 4-stroke engines. The results of that testing are not applicable to Class V handheld engines which are 2-stroke engines and completely different types of equipment applications offering their own issues with catalyst design and engine cooling.

In conclusion, given that the Phase 2 standards are not fully effective, and given the technologies being used to comply as demonstrated in the most current certification data, EPA believes the Phase 2 emission standards for handheld engines are the appropriate standards for handheld engines at this time. This should not be interpreted to mean that EPA will not revisit the standards for handheld engines in the future. Indeed, under section 213(a) of the Clean Air Act, EPA is required to "promulgate (and from time to time revise) standards" for nonroad engines.

1.2.2 Hobby engines

What Commenters Said:

N. Leggett (0603) commented that independent inventors and experimenters should be encouraged because they develop inventions that are different from the technologies developed by large corporations. There are hobby engines used for radio control models that are larger than 50 cubic centimeters in per-cylinder displacement. Presumably these larger engines would be allowed by the statement in the rules that: "Hobby engines are compression-ignition engines with a per-cylinder displacement of less than 50 cubic centimeters or spark-ignition engines installed in reduced-scale models of vehicles that are not capable of transporting a person." The commenter's interpretation of this definition is that engines larger than 50 cubic centimeters per-cylinder displacement are considered hobby engines if they are installed in a model vehicle. Is this interpretation of this statement correct? If it is not correct, the statement should be modified to make it clear that a small engine in a model vehicle is not covered by these regulations. It is important to keep the model scale engines as a free area for the development and use of engines. This maintains an activity where engine designers and inventors are free to make their own engines without mandated design features. Some of these people use desk top machine shops such as the Sherline miniature lathe and milling machine systems (Reference 1). More people are getting involved with their own machining using computer-controlled systems. Still others are using full-scale metal working lathes and milling machines to build their engines. This developmental freedom is a contrast to the regulated engine world where people are blocked from "tampering" with engine features. Indeed, the very process of invention and creative technology design is the basically playful activity of tampering with and departing from conventional engine design. The commenter stated that we need free spaces for invention to maintain America's position in technology and manufacturing. These engine experimenters also develop precious industrial skills.

N. Leggett (0612) commented that the proposed exemption for reduced scale hobby engines is an excellent idea. Designing and building hobby engines is an excellent way to experiment with engine technology and to develop new engine inventions.

L. White offered concern that this proposed regulation would make illegal the production of hobby kits for the construction of a small engine by an individual or student unless the manufacturers submit to and pass the requisite emission tests. The necessity to get such an engine design or personally built kit approved under these regulations would make hobby and educational engine building difficult at best. Putting emission controls on these engines sufficient to meet these standards is inappropriate for their intended historical, educational, and hobby recreational purpose - especially when these engines are replicas of earlier commercial designs that did not have these controls and when the activity is primarily for hobby, experimental, or personal educational use. The expense of certifying such engines and kits built for personal educational, hobby, or recreational use would put an end to this hobby and this business. The extra weight and complexity of certified engines would also most likely make them unsuitable for a number of hobby uses including powering RC model aircraft and small model water craft. These engines are produced in very limited numbers, are generally of low KW output, and see a very limited number of hours of annual use. The total fuel burn and the total emission output are simply not worth regulating. The commenter proposes that a very specific exclusion be incorporated in the proposed regulations such that these limited output and very occasional use engines and kits and the manufacturers or builders of them be exempted from regulations regarding emissions.

Letters:

Commenter	Document #
N. Leggett	0603
N. Leggett	0612
L. White	0620

Our Response:

The regulations as proposed (and currently existing) would apply the limit of 50 cc per cylinder for hobby engines only for compression-ignition models. This was intended to be a threshold below which there would likely be no commercial application other than for hobby vehicles. Given the confusion illustrated by the comment, we believe it is important to adopt a uniform set of definitions and requirements for all hobby engines and vehicles. We are therefore extending the proposed definition for spark-ignition engines to apply equally to compression-ignition engines. Thus, any engine that is installed in a reduced-scale model of a vehicle that is not capable of transporting a person is exempt from emission standards. This change would also mean that compression-ignition engines smaller than 50 cc per cylinder that are installed in other applications would no longer be exempt. However, we are not aware of any such practice today.

While we agree that there is value in allowing for innovation, development, and training with hobby engines that outweighs the potential environmental effects, we need to draw clear lines to prevent widespread use of an exemption to produce engines that could be used for other purposes. In particular, we see no need to expand the hobby-engine exemption to include larger engines or engines that are not used in reduced-scale models of vehicles for exploring innovation or for education. The Clean Air Act and the regulations contemplate the need for such innovation and development with the testing exemption (§1068.210) and the manufacturer-owned exemption (§1068.215).

1.3 Cross-cutting issues

1.3.1 Import-specific information for certification

What Commenters Said:

California ARB supports EPA's "Special Provisions for Compliance Assurance," and specifically supports the provisions regarding importation data, the assurance of warranty coverage, and bond requirements.

Mercury commented that the proposal contains a number of new requirements in § 1045.205 for the content of the certification application. In particular, EPA is proposing to require engine manufacturers to include additional information for imported engines in § 1045.205(z). Mercury Marine fully endorses these changes and supports EPA's efforts to enforce these rules on imported engines.

OPEI commented that it is difficult to keep intended ports of entry updated in the certification applications, particularly if external shipping firms are used (like DHL etc for air shipments). Customs exist at all ports of entry in the US so this requirement seems unjustified. EPA/Customs keeps a list of all US ports of entry available. All ports of entry should be monitored by US customs and the EPA and they should reinforce the need for proper importation paperwork being submitted and checked to verify compliance via the EPA database. The requirement should be deleted.

EMA commented that the specific port that a manufacturer will use to import engines changes from shipment to shipment. For this reason, the requirement to identify the port(s) where a manufacturer will import engines (see §90.107(d)(15)(i) Application for certification**)** cannot be maintained in a certification document. If required to identify a port in the application, the manufacturer would have to submit a list of all potential ports where it may import engines. Such a list would not provide the sought-after information and would fail to provide the intended benefits associated with having this information. Therefore, this section should be deleted.

EMA commented that the NPRM does not clearly identify who is required to name an agent for acceptance of service on behalf of a manufacturer. While it appears that such a requirement applies only to manufacturers that do not have a U.S. presence capable of accepting service, the final rule should clearly state that such a requirement applies only to entities without a U.S. presence. EMA commented that this can be accomplished by moving section 1054.205(z) so that it is included under (aa). However, if the requirement to name an agent for service remains as a separate requirement under subsection (z), the section should be revised to read as follows: "If you do not have a physical office in the United States with employees capable of being served then you must name an agent for service in the United States. Service on this agent ....."

OPEI commented that EPA requires the location of test facilities in the US where the manufacturer can test engines if EPA selects them for an SEA. OPEI feels this is acceptable for manufacturers that do not have an established presence and compliance history (minimum of 5-years) in the US. For those manufacturers that have an established compliance history, it should not be required that all families can be tested in the US. Handheld engines are very specialized and larger engines are hard to test. This section should be revised to indicate options as follows:

1) Conduct the test in the lab where the certification is conducted, or
2) Guarantee EPA access into any of your test facilities anywhere in the world, or
3) EPA can select a lab to have engines tested in the US (if 1 and 2 are not possible).

NMMA commented that the proposal contains a number of new requirements in § 1045.205 for the content of the certification application. In particular, EPA is proposing to require engine manufacturers to include additional information for imported engines in § 1045.205(z). While NMMA understands that some of this information may be helpful to track engines and avoid problems with foreign companies that are importing and selling engines in the U.S. that may not be covered by valid certificates of conformity, some of these requirements are overly burdensome. Notably, the requirement to list the location of test facilities where engines can be tested may not be available at the time the application is submitted. Several Marine SI engine manufacturers test their engines outside of the U.S. and may not have identified and/or contracted with test labs in the U.S. In addition, there are not that many test facilities in the U.S. that can perform marine engine testing. This is particularly the case with OB engines. To address this problem, NMMA recommends that § 1045.205(z)(3) be revised to state instead: "Provide upon request, ~~T~~the location of test facilities in the United States where you can test your engines if we select them for testing under a selective enforcement audit, as specified in 40 CFR part 1068, subpart E." NMMA is supportive of EPA's efforts to eliminate copy and noncompliant engines from the market and this revision will ensure that the pertinent port and agent information is provided but will not mandate that the manufacturer contracts with a test facility prior to submitting the application.

Suzuki commented that EPA is proposing to require companies that import engines into the United States to identify test locations in the United States that would be used if the Agency requires testing under a selective enforcement audit (SEA). Suzuki is concerned that it will be overly burdensome to specify a test facility well in advance of any actual testing if the importer does not have an existing business relationship with the US-based test facility. Suzuki understands that there are numerous entities certifying and importing outboard engines into the US, and that there can be difficulties with ensuring that the importer will be held accountable should a noncompliance issue exist. EPA's proposal will help to address this concern; however, Suzuki believes it to be overly broad. Suzuki recommends that EPA revise the proposal to consider relevant factors when determining if an importer must declare a test facility in advance of a SEA test order. Suzuki believes that relevant factors could include the length of time an importer or distributor has been certifying engines in the US and/or the certification history of the importer (this could include previous SEA test history, in-use test history, responsiveness to prior Agency information requests, etc .) Alternatively, EPA could allow SEA testing to be conducted at the manufacturer's own testing location if the location was deemed appropriate by EPA.

Honda commented that at the time of certification of both Small SI and Marine SI engines, it may not be possible to name a test facility in the United States that will be a viable option for testing when at some future date EPA requests a manufacturer to perform testing. For some engines that are manufactured or are similar to engines manufactured in the United States, this up-front designation may be reasonable. However, for engines requiring an outside (third party) test facility, it would be more appropriate to choose that test facility at the time testing is actually requested. Alternatively, a manufacturer could ensure that EPA representatives have full and open access to existing test facilities located outside the United States.

Manufacturers described that it would be burdensome to name a test lab, because they would need to make extensive preparations and do round-robin testing periodically to ensure that the named test lab would properly test engines.

Letters:

Commenter	Document #
NMMA	0688
Mercury	0693
Suzuki	0698
California ARB	0682
Honda	0705
OPEI	0675
EMA	0691
NMMA	0739

Our Response:

It can be very useful for us to understand a manufacturer’s general practice for importing engines into the United States. Knowing which ports a manufacturer uses would help us target certain engines for more careful monitoring or inspection if there were a cause for concern or a need to identify engines at the port for a selective enforcement audit. We acknowledge the manufacturers’ concern that they should not be limited to any particular ports identified in the application for certification, given the dynamic nature of shipping engines and equipment. To address this concern without simply deleting the provision, we are modifying the regulatory language to specify that importing manufacturers must identify the ports through which they have imported certified products in the previous 12 months. This limits the submission to factual, historical information that is readily available.

It is not clear why EMA would object to naming an agent for service in the United States. We have a need to know whom to contact if there is a need for official communication, regardless of the location of the company. It is especially important to require this for companies based outside of the United States to ensure that there is a point of contact. It is self-evident that companies located within the United States can be contacted, but there is still a strong advantage to knowing before an issue arises that there is an established contact person to handle official communications. This could be as simple as identifying the person submitting the application for certification as the agent for service. As such, we would understand that there is no burden associated with this requirement and are adopting it as proposed for all companies.

Independent of the proposal requiring manufacturers to name a test lab in the United States, the regulations state that we may specify any test lab for measuring emissions from certified engines (§1068.401). As long as the emission measurements conform to the specified procedures in 40 CFR part 1065 and in the standard-setting part, the results would be considered valid for determining whether or not the engines meet emission standards. As a result, the provision to name a test lab in the United States does not expand the manufacturers' liability but rather gives the manufacturer the opportunity to plan ahead of time to identify a lab where arrangements can be made to ensure that the testing will be done properly.

We believe it is important to preserve the proposed requirement to name a test lab in the United States. This would allow us to promptly pursue a selective enforcement audit for imported engines where we find that to be necessary or appropriate. Under selective enforcement audits, manufacturers test freshly manufactured engines, at their own expense, to determine whether they meet applicable emission standards. It may not be practical to pursue testing if the engines need to be shipped back to the country of origin. This is especially true in countries where EPA agents would not necessarily be able to freely travel or perform official functions. Testing in the United States also allows us to require statements and submission of information where U.S. laws apply, including the requirement to submit truthful information to the government (with the corresponding civil and criminal penalties for violations). This requirement removes an inherent advantage for imported engines, since there will always be a U.S. lab available for testing domestically produced engines. It also serves as a preventive measure by forcing manufacturers to recognize that they are liable for the compliance of their engines even after they have been sold.

The manufacturers raised several specific objections, none of which address the fundamental issues described above. First, it would be impractical to require manufacturers to name a test lab "upon request" at the point of importation. Manufacturers have already stated that they don't want to test engines in the United States, so this request would likely be met with resistance and delay. The resistance would be greatest in cases where domestic testing is most needed. As described above, we could in any case pick any test lab without the manufacturer's direction, so we believe it is in the manufacturer's best interest to name the test lab at certification.

Second, manufacturers could provide statements regarding their commitment to ensure access to test labs located in other countries, but that is not always reliable. Manufacturers would offer such assurances at certification whether or not they intended to cooperate, or whether or not local government officials would cooperate. The burden would be on EPA to identify engines for testing, then possibly find that the manufacturer is not willing or able to follow through on its commitment. This would also put EPA in an awkward position, which would likely again result in tests being run at a test lab in the United States where no prior arrangements had been made. This outcome would not be in the best interest of EPA or the manufacturer.

Third, we believe any published measure of good compliance history is not appropriate for excluding a manufacturer from the responsibility to name a test lab in the United States.

However, we may take this into account in deciding whether to allow the manufacturer to conduct testing in the country of origin or not. The testing in question may be what we need to establish whether or not a manufacturer has been producing noncompliant engines. Also, with the very large number of certifying manufacturers and emission families, it is easy to imagine that a manufacturer could be in violation for a considerable period without being caught. Creating this exception would inappropriately reward companies that are able to avoid detection of violations.

Fourth, we believe there are labs available for testing almost all kinds of engines, including large and small engines, and all sizes of outboard engines. To the extent that manufacturers depend on special test procedures or specialized test equipment, we would cooperate with the manufacturer to ensure that testing can be done properly. However, we have modified the original proposal to create two exceptions. Manufacturers are generally not required to name a test lab for engines rated over 560 kW. These engines are much more expensive and are sold in much smaller volumes, so any effort to test these engines would necessarily involve considerably more effort to make those arrangements. For engines above a certain size, there are also very few if any locations available for testing. Also, manufacturers of Small SI engines may omit naming a test lab for engine families where testing depends on custom test fixtures that are not available without making special arrangements. This allowance is limited to engine families representing less than five percent of a manufacturer's total U.S.-directed production volume of Small SI engines. While we are waiving the requirement to name test labs for these special cases, we may still require manufacturers to do selective enforcement auditing with these engines by testing them in the United States to the extent that is possible, but we are not requiring the companies to prepare for that by making these arrangements ahead of time.

We understand that manufacturers would be well served to invest some effort in coordinating with the named test lab to ensure proper testing. On the other hand, the fact that manufacturers are concerned that another lab may get different results reinforces our concern that this provision is necessary. Testing of certified engines should show that the engines meet emission standards for any valid test, regardless of the test location.

Manufacturers might also name multiple test labs if they have made arrangements with different companies that perform such testing. If manufacturers are confident that a valid test at any facility will show that their engines comply and they have no relationship with testing organizations in the United States, they might also indicate in the application for certification that all test labs in the United States are acceptable for confirmatory testing.

When we select imported engines for testing, we expect to work with the manufacturer to make the necessary arrangements. We would generally plan to test engines in the United States. However, in certain circumstances we may agree to allow testing in the country of origin if we have reason to believe that the testing will be properly performed and that we will have unrestricted access to the foreign test facility.

We are therefore adopting the proposed requirement to name a test lab in the United States, with the modifications noted above, as supported by Mercury Marine and California ARB.

1.3.2 Date of manufacture on label

What Commenters Said:

ISMA commented that they do not support the recommended change to § 1051.135(c)(6). EPA has proposed to remove the flexibility of keeping records of the manufacture date in lieu of printing the month and year of manufacture on the label. This change results in a large burden on the manufacturer with no benefit to the environment. Each vehicle must have its certified engine family name on the emission control information label. The vehicle or engine's model year is clearly indicated on this label through the first character. Since the EPA snowmobile regulation is based on model year, not calendar year, placing the month and date of manufacture on the label does not provide meaningful information. ISMA manufacturers will continue to maintain records of build dates for their vehicles, and respectfully requests EPA maintain the current language in 40 CFR 1051.135(c)(6).

MIC commented that § 1051.135(c)(6) allows omitting date of manufacture from the label only if the date is stamped on the engine/vehicle. Stamping each vehicle or engine with the build date is burdensome and unnecessary. The rationale for this change is that it is needed for verifying that vehicles comply with standards based on their build date. However, it is also required that the label "state the exhaust emission standards or FELs to which the vehicles are certified (in g/km or g/kW-hr)." Given this requirement, the build date is unnecessary.

Arctic Cat submitted a comment regarding §1051.135(c)(6). The new proposal will require that the date of manufacture is included on the Vehicle Emission Control Information (VECI) label. Arctic Cat requests an exemption from this requirement for replacement labels (usually needed when a replacement tunnel is provided to a snowmobile customer). These replacements number about one hundred per year to service all past production. Since this affects used units that have already cleared customs and are no longer in a dealership there is little value in making the extra effort to ensure a correctly dated VECI label is supplied. Arctic Cat proposes including the phrase "replacement label" in the field for the date (shortened if necessary to fit in field). The difficulty of including the date on a replacement VECI label is that it is too resource-intensive to create the label and manage the logistics to make sure this exact label is supplied to the customer.

Honda also commented on the pending regulatory changes to §1051.135(c)(6). Honda has not had sufficient time to evaluate the impacts and requirements this proposal will have on its production efforts. Honda requests EPA's approval to not include the production date for the 2009 model year.

Honda continued that the current regulations allow them the opportunity to not print the date of manufacture on the VECI labels as long as they stamp the date on the vehicle or maintain records and provide them to EPA upon request. As EPA is aware, the proposed regulation does not include the option to maintain records and provide them to EPA upon request. Honda would prefer to maintain records of the manufacturing dates, as they are currently doing, and provide them to EPA upon request. Honda questioned whether there was a particular reason why this option was no longer being provided. With the issuance of the Final Rule being delayed so close to the start of the 2009 model year, Honda noted that several months will be required to prepare and implement the printing of the production date on the VECI labels. This can have a significant impact on their early model year production.

Suzuki commented that as a motorcycle manufacturer Suzuki is concerned about the labeling requirement proposed in § 1051.135(c), as this is a totally new requirement. They supported the MIC comments on this issue, which reflected their position. Additionally, Suzuki questioned whether they can assume that a MY 2010 effective date will be applied to whatever revisions to part 1051 are finalized.

MIC reiterated its concerns with EPA's proposed changes to the Recreational Vehicle regulations at 40 CFR part 1051.135(c)(6). The current regulation allows the date of manufacture to be omitted if a manufacturer keeps a record of the date and provides these records to EPA upon request. This change is of concern to manufacturers because the increased burden is significant. MIC argued that there is no benefit from requiring this of mainstream established manufacturers. This change appears to be targeted at EPA's oversight of importation of nonmainstream engines and not control of established manufacturers, therefore a more appropriate approach should be found to address the problem without overly burdening compliant manufacturers. MIC wants to reiterate that this requirement change will impose significant problems for the following reasons (but not limited to):

- Space allocation on engine emission labels is very limited; on many smaller engines emission label space is extremely limited
- Emission labels are often not printed at the factory and therefore it is not possible to create a unique emission label reflecting the manufacture date
- Even if it is possible to incorporate the date on the emission label, sufficient lead time is not provided in the regulation change to provide for 100% assurance of labeling accuracy
- Many engines do not have space for incorporating an engraved date and would require revised casting (extremely expensive)
- Even if space is available on the engine for engraving the date, plants are not equipped for performing this engraving operation (expensive equipment and production line changes are required)

In addition to the above implementation issues, MIC stated that recreational vehicle engines are not considered complete until they are assembled into the vehicle. If the manufacturer identifies the date of manufacture on the vehicle and the engine has a separate label stating a different date of manufacture; unnecessary confusion (not to mention redundancy and cost) will result. MIC believes that the current approach of requiring the manufacturer to have a readily available tracking method for the assembly of partially complete engines is sufficient and that an additional label on the engine adds no benefit.

MIC is interested in continuing to work with EPA on developing a method for addressing whatever the basis is for making this change in the regulation but does not agree that the current approach is acceptable. MIC requests that at the very least EPA should provide additional lead time for the above issues to be properly addressed in the production process and that implementation should be no earlier than model year 2012.

In later comments, MIC emphasized that this was an important issue for them. They stated that they understood EPA's rationale for the requirement to identify the engine build date on the engine or vehicle, but pointed out that the implementation date for this requirement prohibits the use of labels that have already been printed by the manufacturer. The MIC proposed language below would allow for the engine build date to be printed on a supplemental label that is affixed adjacent to the main emission control information label:

> § 1051.135(c)(6) State the date of manufacture [MONTH and YEAR]; however you may omit this from the label if you stamp or engrave it on the engine or vehicle, or if you provide this information on a supplemental label. If you use a supplemental label, it must be visible when viewing the primary emission control information label and comply with the placement, durability and legibility requirements as described in this part.

Letters:

Commenter	Document #
ISMA	0671
MIC	0701
Arctic Cat	0709
Honda	0736
Suzuki	0732

Our Response:

Under the Clean Air Act, engine certification is based on annual production schedules (or model years) where a manufacturer produces each engine during a production period such that it is covered by a valid certificate of conformity. Identifying an engine's build date establishes clearly for each engine whether it is covered by a certificate of conformity for any given model year. Properly associating each engine with the appropriate model year is important for identifying applicable emission standards, calculating emission credits (where applicable), tracking emission-related defects, and executing a recall, among other things. We are adopting regulatory provisions in this rule that further clarify the concept of build date, model year, and the effective dates of certificates of conformity in 40 CFR part 1068 for all nonroad engine categories and in the standard-setting parts. We believe each engine should be clearly identifiable with a certain model year based on its build date. Having this information recorded on the engine prevents a situation in which a manufacturer could manipulate records as needed to gain a more favorable outcome depending on the reported build date of any particular engine or engines. For example, we may find a collection of engines in violation and would want to establish whether they are from the same model year or not, or whether they were built before or after a given change in the application for certification. Our experience has shown that it is very difficult to contest a manufacturer's claimed build date, even when it defies any customary business or manufacturing process. We also find it inappropriate generally to have to depend on manufacturers to provide information that is necessary to determine whether that manufacturer has committed a violation.

A further practical constraint comes from engine inspections, especially at importation where U.S. Customs and Border Patrol agents have limited time to evaluate large quantities of very diverse products. Inspection of engines often depends on knowing an engine's build date to establish which tier of emission standards apply. A straightforward inspection of an engine should allow an inspector to determine the applicable standards.

Having the build date on an engine would also provide a valuable piece of information because the manufacturer makes a commitment in the assembly process by printing a specific date on the engine (generally month and year). This information is necessary for us to be able to evaluate whether an engine was produced before or after the effective date of a certificate of conformity. The printed build date information is unalterable, which is very effective for both compliance assurance (or prevention of noncompliance) and enforcement. For example, manufacturers would be very reticent to put a false date (such as a postdate) on an engine if there was a possibility that someone may inspect that engine shortly after the manufacturer introduces it into commerce and where it would be directly evident that the date is in error. Likewise, if the printed date is substantially earlier than the actual production date, it may be possible to inspect associated records to evaluate the validity of the printed date (production records by serial number, build dates of equipment in which the engine is installed, invoices, bills of lading, etc.). Having the ability to demonstrate that an engine was produced after emission standards started to apply is essential both for our benefit to ensure compliance, and for the manufacturer's benefit to prove compliance.

Furthermore, where there is a compliance problem, it may be easier to demonstrate that a false build date is a violation than that the engine exceeds emission standards. Requiring build dates on labels requires that manufacturers make a statement to the government, where penalties may apply if the information is demonstrated to be false.

We allow for applying the label and identifying the date of manufacture at any point in the assembly process. Manufacturers could use pre-printed labels that are punched to identify month and year, or the label printing could be brought in as part of the assembly process. Manufacturers may also identify the date of manufacture elsewhere on the engine, such as on a different label applied for other purposes. In any case, the manufacturer could take steps to avoid mismatched dates on different labels if that is a priority objective.

We acknowledge the concern for labels on replacement components. We understand this to be a relatively rare occurrence and agree that it would be rather impractical to include build dates on these replacement components without a disproportionate effort. We are including this exception in the new language related to replacement labels in §1068.101(b)(7).

We are adopting the proposed requirement to print build dates on the label. We understand that this will involve a change in labeling practices for some companies. On the other hand, manufacturers of Small SI and Marine SI engines have already been doing this for several years so the feasibility of identifying engines this way is well established. This is part of a broader effort to adopt this requirement across engine categories. We intend to further standardize labeling with further specification related to the format of the build date. For example, we believe it is not appropriate to identify the date with coded alphanumeric characters intended to disguise the information from anyone who is not privy to the coded meaning. Spelling out the full date is clearly acceptable. We would also consider acceptable certain standard abbreviations, such as Sep 10 or 09/10 to indicate September 2010. We plan to propose detailed specifications in a future rulemaking to describe a range of acceptable ways to identify an engine's build date.

We agree with MIC's concern that multiple dates on a single engine or vehicle would be confusing and unnecessary. We have therefore modified the labeling requirement to say that permanently applying the date elsewhere (not just by stamping or engraving on the engine) would be acceptable for meeting specifications. Given that manufacturers of recreational vehicles are already putting build dates on their vehicles, we believe there is no need to delay this requirement beyond the 2010 model year.

1.3.3 General labeling provisions

What Commenters Said:

EMA commented on regulatory language we introduced in a new §1068.45 to lay out general labeling requirements. These comments included the following suggestions:

- Using the term "removable label" throughout part 1068 in place of the term "temporary label."
- Including an example to illustrate that a removable label for replacement engines should remain in place until the exemption no longer applies.
- Allowing hang tags to qualify as removable labels since they can be made durable enough to stay in place until they are removed.
- Referring to §1068.101 in §1068.45(e) in regard to improper removal of labels is vague and should be removed.

EMA said the provisions in §1068.101(b)(7) regarding label removal should include an allowance for removing and replacing labels that are incorrect, whether they were wrong initially or they were rendered inaccurate by an engine modification.

In addition, EMA commented that the regulations in several instances specify that labels for exempted engines include information related to engine displacement and rated power. They argued that this information should not be required.

Letters:

Commenter	Document #
EMA	0808
EMA	0810

Our Response:

We believe it is quite appropriate to point readers to the provisions in §1068.101 that describe provisions related to label removal. This does not change any of the regulatory requirements, but we believe readers may not be aware of those provisions without a specific reference. We agree with EMA's other suggested changes to §1068.45 and have incorporated those into the regulations.

We agree with EMA's suggestion to allow for removal of incorrect labels. A single statement can cover both of the scenarios EMA highlights; a label is incorrect anytime it is no longer true, whether that was always the case or the engine's original, correct label is no longer accurate. We are also including language to clarify that the allowance to remove and replace labels does not change the fact that applying an original label that is incorrect may be a violation of the prohibited acts. We simply intend to allow for the manufacturer to rectify incorrect labels and would separately consider the original action of applying a false label.

In almost all cases, we want labels on exempted engines to identify the engine's displacement. This is important identifying information that helps to prevent a situation in which an exempt label is applied to the wrong engine. Identifying the displacement helps the engine manufacturer and anyone inspecting the engine to know that the labeled engine is properly covered by the exemption in question. We agree that rated power is generally not needed. However, in certain cases, we might approve an exemption only for certain power ratings for a specific engine model. For those few exemptions where we might want manufacturers to identify an engine's rated power, we have modified the regulation to allow us to require that if it is needed. In no cases do we have a default requirement to identify the rated power for exempted engines.

1.3.4 Special provisions for production-line testing

What Commenters Said:

MIC commented on §1051.301(a)(2) of the proposed regulations. MIC commented that the exemption from PLT for small volume families should not be left to the discretion of EPA staff. The proposed language states that the exemption "may" be provided. The language of §1051.301(a)(2) should be revised to say "Engine families with a projected U.S.- directed production volume below 150 units are exempt from testing under this subpart."

ECO commented that EPA should allow small-volume engine manufacturers to utilize the use of alternative testing methods (portable emissions analyzers) to demonstrate in-use field testing compliance for production units.

Letters:

Commenter	Document #
MIC	0701
ECO	0712

Our Response:

We continue to believe it is appropriate for manufacturers to be required to request a PLT exemption for small-volume engine families in the application for certification. For example, we are concerned that manufacturers may attempt to gain an advantage by underestimating projected sales. The request process should be fairly simple, since manufacturers are required to certify each of their engine families and they must submit a sales estimate. We would grant or deny the exemption request as part of the certification approval process. We have added language to the regulations in each of the applicable standard-setting parts to clarify that we would approve the request if we agreed that the projected sales volumes were made in good faith.

We agree with ECO's suggestion to clarify the language related to alternative methods for production-line testing. The original language was intended to allow for manufacturers to develop different ways of testing production engines for proper quality assurance with respect to emission controls. The initial thinking was that a simpler test (such as ppm testing at multiple modal points) on a large number of engines could be more effective at screening production engines than a rigorous (certification-quality) test on a small number of engines. We continue to believe there is a good potential for this type of alternative test program. The specific suggestion to allow the use of field-grade measurement equipment for production-line testing is an appropriate additional alternative. We have modified the regulation for all spark-ignition engines to allow for using field-grade measurement equipment, provided that the manufacturer doubles the minimum sampling rate. Much like the ppm testing described above, the somewhat less precise or accurate test methods should provide an equivalent compliance demonstration by expanding the sampling rate. We would expect portable analyzers to reduce the cost of testing enough to more than offset the burden associated with testing additional engines. Note that testing with portable analyzers that meet lab-grade specifications would not be considered an alternative test method and would therefore not be subject to EPA approval and would not trigger the need to increase the sampling rate.

1.3.5 Reporting and recordkeeping requirements

What Commenters Said:

Kohler Co. is very concerned with the record keeping and reporting burden associated with the proposed regulation. Table XIV-l in the proposal lists the average burden for a Small SI engine manufacturer at 885 hours annually. This is reported to be the total estimate for both new and existing reporting requirements for total time required to "generate, maintain, retain, or disclose or provide information to or for a Federal agency." This equates to less than half time for a person working 40 hours per week. Kohler knows this estimate is grossly understated and that they will need to add additional staff to deal with all of the record keeping, reporting, correspondence with customers and auditing required by the proposed regulation.

Kohler continued that it appears that in drafting the regulation, the Agency, in its drive to ensure manufacturers sell compliant engines, has incrementally added requirements until the total burden is excessive. They ask the Agency to take a careful look at the proposed regulation from the prospective of those who need to comply. Kohler asked that we make it more "user friendly" and cost effective by eliminating all unnecessary record keeping and reporting. They said that the resources required to perform this unnecessary and burdensome recordkeeping, reporting and paperwork is time and effort that cannot be expended on cleaning up the engines to provide real environmental benefits.

Kohler commented on the following, but certainly not all inclusive, examples of sections in the regulation where we feel reductions can and should be made:

§91.1013 — Exemption for certified Small SI engines
This section includes a reference to § 1045.605 which requires that small offroad engines (SORE) used as marine propulsion engines must have special labeling and record keeping. Kohler feels this is unnecessary since the engines are already labeled as compliant to the SORE regulation and represents an additional undue burden for manufacturers.

§1054.130 — What installation instructions must I give to equipment manufacturers?
Kohler feels there is a significant burden on engine manufacturer regarding evaporative emissions and general installation instructions.

§1054.205 — What must I include in my application?
Paragraph (a) requires for each engine configuration inwhich the maximum modal power is at or above 15kW a listing of the maximum power and the range of values for maximum engine power resulting from production tolerances. Kohler feels this is another unnecessary reporting burden.
Paragraph (r) requires describing how engines comply with emission standards at varying altitudes and atmospheric pressures. Kohler suggests this will be a significant reporting burden that is not required today.

§1054.610 — What is the exemption for delegated final assembly?
Paragraph (c)(6) requires keeping records to document how many engines are produced under this exemption. Also, manufacturers need to keep records to document contractual agreements under paragraph (c)(3) of this section.
Paragraph (c)(3) describes a contractual agreement with equipment manufacturers and the records required for this, so this section essentially is requiring the keeping of records on the keeping of records. In general, Kohler feels this section's description of the recordkeeping, labeling, and auditing appears overly complicated and confusing to the point that it will be commerce restricting.

§1054.825 What reporting and recordkeeping requirements apply under this part?
Kohler believes there are significantly more reports and recordkeeping than in Part 90; EPA needs to review and make them more manageable.

EMA commented on §1054.825 "What reporting and recordkeeping requirements apply under this part?" Kohler stated that the report and recordkeeping requirements set forth in this section are significantly more substantial than those currently required by 40 CFR Part 90 and are overly burdensome. Kohler said that EPA should review the proposed requirements and make whatever revisions are necessary in order to reduce such requirements and decrease the substantially increased compliance burden associated with the proposed regulation.

MIC commented that § 1051.825 states that "the following items illustrate the kind of reporting and recordkeeping we require for vehicles regulated under this part." The title of this subsection is "What reporting and recordkeeping requirements apply under this part." To be consistent with the title and the presumed intent, the statement should be revised to read "The following items are the reporting and recordkeeping we require for vehicles regulated under this part:"

Letters:

Commenter	Document #
Kohler	0703
EMA	0691
Motorcycle Industry Council	0701

Our Response:

We agree that the proposed rule included several new reporting and recordkeeping requirements. We have been careful to include only requirements that we believe are necessary to allow us sufficient ability to oversee these programs to ensure that we can adequately implement and enforce the regulatory requirements. The final rule includes several adjustments to take into account the interest in reducing the compliance burden wherever possible. We take Kohler's list of suggested opportunities for reducing the recordkeeping burden to illustrate our interest:

§91.1013: We agree with Kohler that Small SI engines used for marine propulsion should not trigger new labeling or recordkeeping requirements. For bigger engines we would be concerned about creating a path for manufacturers to rely on an existing certification to avoid requirements that apply specifically to marine engines. However, the relative stringency of standards and the extent of sales for certified Small SI engines used for marine propulsion lead us to conclude that a simple exemption from the marine requirements is appropriate.

§1054.130: We would expect that engine manufacturers are already providing equipment manufacturers with installation instructions to address basic parameters such as inclusion of intake or exhaust system components that meet performance specifications and placement of exhaust components to ensure safe operation. The incremental effort to identify those items necessary to ensure that engines and fuel systems are in the certified configuration after installation in the equipment should be very small. In fact, we would expect engine manufacturers to do this even if it were not required because they are liable for the emission controls after the engines are installed. The installation instructions serve more to define the limits of proper installation so it will be clear that it is the equipment manufacturer's fault if engines were not installed according to the instructions.

§1054.205: Knowing whether engines are covered by one program or another is fundamental. In the case of Small SI engines, this hinges largely on the maximum engine power. We believe it is very reasonable to require manufacturers to identify the maximum engine power for engines that are approaching the thresholds established in the regulation. We are reducing this burden for the final rule by revising the regulation to more carefully identify those engines that are close enough to the threshold to warrant this reporting.

§1054.205: Manufacturers are required under part 90 to comply with emission standards at altitude, though the regulations allow manufacturers to do this with an altitude kit. However, since part 90 includes no reporting or recordkeeping requirement, we have no reason to believe manufacturers are taking any steps to ensure that their engines meet emission standards at altitudes different than at the lab used for certification testing. We believe the new regulations provide a minimal reporting and recordkeeping burden associated with the conditional allowance to meet standards at high altitudes based on the use of engine modifications to install an altitude kit.

§1054.610: We understand delegated assembly to be an optional provision that manufacturers can exercise to help in cooperative relationships with component suppliers and equipment manufacturers to assemble finished products. Since catalysts are such a fundamental part of the emission control system, several measures are needed to ensure that engines in final installations are properly assembled such that they are in the certified configuration. The contractual arrangements, labeling, audits, and other measures are necessary to give us the confidence that engines will be routinely assembled properly. If the burdens of this oversight are too great, manufacturers can simply default to the normal plan contemplated in the regulation, which involves engine manufacturers shipping only engines that are already in the certified configuration. This is common across EPA programs today.

With regard to the comment on §1051.825, the new text in §1051.825 (and similar sections in other programs) is intended to help us administratively in the effort to maintain current information collection requests with the Office of Management and Budget and to align with the list of approved information collections in 40 CFR part 9. While we have attempted to provide a complete list of recordkeeping requirements in this new section, we cannot be certain that it is absolutely comprehensive. This becomes especially true from a long-term perspective, since we may add requirements and inadvertently omit those requirements from §1051.825. We would not want a manufacturer to be able to claim that a reporting or recordkeeping requirement that is clearly stated elsewhere in the regulation is not valid simply because it was omitted from §1051.825. We are therefore keeping the language unchanged as illustrative of the requirements that apply throughout part 1051.

1.3.6 Inventor issues

What Commenters Said:

N. Leggett commented that we need to encourage the independent inventors who design and build their own full-scale spark-ignited engines. Experimental engines should be automatically exempt from regulations. The inventor should not have to apply for some sort of exemption. Rather the exemption should be automatically applicable to single engines that are built by experimenters themselves. These individual experimenters should not be considered to be engine manufacturers.

N. Leggett commented further that the opportunities to experiment with engines are of major importance to the economic and social future of the United States. Independent inventors and experimenters should be encouraged to experiment with engines. Their activities will lead to the development of new engine technologies.

N. Leggett also commented that a community of skilled hobbyists restores antique gasoline engines to operating condition. They operate their engines on occasion including showing them in action at shows and rallies of antique engine enthusiasts. Some of these people install their restored engines in restored or rebuilt antique boats. These people perform a useful function in the study and appreciation of American history. They too should be encouraged in their efforts to bring antique technology back alive. These engines should have automatic exemptions to the proposed emissions rules. In addition, a related activity to the restoration of antique engines is the building of replica antique engines from kits. Many of these kits are in the form of rough castings that the builder then machines into an operational engine. This type of kit building is a challenge to one's shop skills. Other kits are based on already machined parts. Many of these engines are small displacement hobby engines, but not all of them are small. These kits should also be automatically exempted.

N. Leggett commented that these exemptions to the proposed regulations are needed to establish a free zone where experimenters and inventors are free to develop their own engine designs and inventions. This is a contrast to the regulated engine world where people are blocked from "tampering" with engine features. Indeed, the very process of invention and creative technology design is the basically playful activity of tampering with and departing from conventional engine design. We need free spaces for invention to maintain America's position in technology and manufacturing.

Letters:

Commenter	Document #
N. Leggett	0603

Our Response:

We believe it is very problematic to introduce an exemption specifically for inventors' experimental engines, or homemade engines. An experimental-engine exemption as recommended in the comments would be impossible to enforce. Without a request or approval process, there would be no way of confirming that engines produced under such an exemption would in fact meet even the minimal conditions described for the exemption. The Clean Air Act and the regulations contemplate the need for experimental engines with the testing exemption (§1068.210) and the manufacturer-owned exemption (§1068.215), as described in Section 1.2.2. The testing exemption in particular would allow inventors to build, test, and operate their experimental engines. EPA's role in evaluating such exemption requests would be to confirm that the scope of the exemption is appropriate for the company or individual requesting the exemption and that the applicant understands the responsibilities associated with the exemption.

The commenter's interest in an exemption for antique engines is mostly unnecessary. To the extent that someone restores engines that have already been placed into service or installs such engines in restored vehicles, these engines are not subject to standards and therefore no exemption is needed. Building replicas of antique engines is a different matter. To the extent that these antique engines meet our definition of "engine," they are subject to emission standards and therefore must either be certified or qualify for an exemption. These engines may qualify in some cases for the hobby-engine exemption. In other cases, the Clean Air Act and the regulations contemplate this scenario with the display exemption (§1068.220). However, this exemption is available only to companies that hold a valid certificate of conformity with EPA. As described above, adding an exemption as recommended by the commenter would lead to a situation where we would be unable to confirm that engines are being exempted appropriately. For example, the more common form of building replica engines is for a company to build knockoff engines, imitating an engine by disassembling it and “designing” parts for a new assembly by carefully measuring the original parts. This is a very significant compliance problem. We believe there is not enough value in preserving an allowance to build new, fully functioning, replica engines to outweigh the compliance and enforcement problems that would result. If someone wants to build such an engine, that would be allowable as long as the engine does not include a crankshaft. Such an exercise would still provide plenty of challenge for machining and assembly; however, the value of the resulting assembly would be limited to display purposes, without the benefit of producing usable power.

Innovation is clearly important to our future economic health and welfare. Our interest is in preserving a free zone for innovation without creating a zone where companies are free to produce large numbers of noncompliant engines. Even under the current requirements we are finding many thousands of engines that are being sold illegally. Any relaxation of current requirements would therefore need to be done very carefully to avoid making this situation worse. We understand that some inventors may find the paperwork and approval requirements to be burdensome, but we believe the current regulatory framework allows for innovation with a minimum of administrative requirements.

1.4 Amendments to engine-testing provisions in 40 CFR part 1065

We adopted extensive changes to the test procedures in part 1065 as part of the rulemaking to set emission standards for locomotive and marine diesel engines. We have identified a few additional revisions that we are including in this final rule. Some of these changes are necessary to address issues related to Small SI or Marine SI engines. Other changes involve corrections or clarifications of a more general nature.

What Commenters Said:

California ARB commented that EPA is proposing to allow the use of non-dispersive ultraviolet analyzers (NDUV) to measure NOx emission levels in addition to the currently accepted chemiluminescent detector (CLD). California ARB generally allows the use of alternative measuring methods if a manufacturer can demonstrate equivalency with the current accepted method. Recently, a manufacturer requested California ARB’s approval to use NDUV to measure NOx levels for small off-road spark-ignited engines. In response, California ARB requested the manufacturer provide data to show equivalency between emission results from NDUV and CLD. The manufacturer referenced a 2002 study conducted at EPA facilities wherein testing of NDUV technology for NOx measurement was performed on gasoline powered light duty passenger vehicles. However, it is worthwhile to note that despite the results of the study, EPA has not approved the use of NDUV for NOx measurement for light-duty gasoline vehicles. The manufacturer also provided limited test data from a single small spark-ignited engine. The data provided by the manufacturer did not indicate high correlation between the two methods and, instead, raised questions about the use of NDUV for official certification purposes at this time. California ARB requested EPA establish a test program to generate data and determine if high correlation between NDUV and CLD measurement technologies exists before allowing its use to measure NOx emission levels in small off-road spark-ignited engines.

EMA commented that the requirement to obtain speed and load data at 5 Hz update rate is not necessary for steady state testing (§1065.110(e)). EMA recommends that for steady-state testing the data acquisition requirement be amended to 0.5 Hz minimum.

EMA commented that new analyzers are not configured for adjustability of FID response. Accordingly, §1065.360 should be revised to reflect current analyzer industry practice.

EMA commented that the complete engine mapping procedure defined in §1065.510 is not required for Small SI engines. The Part 1065 requirement should include clarification that this requirement can be omitted per the standard setting part.

Cummins commented on draft language to amend the requirements related to cycle-validation criteria in §1065.514. They would still have to use §1065.514(f)(3)(i) because (ii) [the new provision based on existing requirements in part 90] does not use the statistical method. If there was going to be a mode-by-mode validation allowance in part 1065, they wanted to generalize it for all discrete-mode tests for consistency. The need for mode-by-mode verification did not seem to be unique to a specific engine size or technology. It appeared that the request was made to allow a lower-cost alternative method. It would be cheaper to only log average, min, max, etc. values for each mode rather than log 1 Hz data. If it is intended that this option will go away in the future, then Cummins recommended pulling it out now and putting it in part 1054 for Small SI engines. It could then be dropped from Small SI as appropriate in the future without confounding testing for other engine categories.

Letters:

Commenter	Document #
California ARB	0718
EMA	0691
Cummins	0795

Our Response:

The performance specifications adopted for NDUV analyzers are intended to ensure that measurements will properly characterize an engine’s emission levels. For example, Small SI engines may have somewhat higher levels of lubricating oil in the exhaust stream, which could cloud the lens and other components of the instrument, leading to inaccurate results. However, under this arrangement the NDUV analyzer would not reliably meet performance specifications that would allow for a valid test. To avoid a situation where a manufacturer meets calibrations and then performs testing with other engines that may cause such a problem, we are revising the regulation to note that good engineering judgment may preclude manufacturers from using an NDUV analyzer if sampled exhaust from test engines contains oil (or other contaminants) in sufficiently high concentrations to interfere with proper operation.

We revised the provisions of §1065.110 and §1065.512 to specify 5 Hz measurements for transient testing and 1 Hz measurements for steady-state testing. This addresses the manufacturers' concern without foregoing measurement accuracy. We made these changes as part of the rulemaking to set standards for locomotive and marine diesel engines (73 FR 37096, June 30, 2008).

We made extensive changes to §1065.360 as part of the rulemaking to set standards for locomotive and marine diesel engines (73 FR 37096, June 30, 2008). These changes were made in collaboration with EMA members. However, it is important to note that adjustability is critical to proper use of a FID for measuring exhaust hydrocarbons. We therefore believe it is not appropriate to use a FID that lacks adjustability.

Part 1065 already includes general language stating that the standard-setting part governs when there is any difference in the specified procedures for a particular set of engines. If we were to reference every case where one of the standard-setting parts included additional or differing provisions, we would forego much of the advantage of adopting a comprehensive set of regulations that are not category specific. We are therefore not making the change to part 1065 to include a specific reference to the lack of mapping requirements for engines subject to part 1054.

We agree with the suggestion from Cummins to move the new approach to cycle-validation criteria to part 1054 so it applies only to Small SI engines.

1.5 Amendments to general compliance provisions in 40 CFR part 1068

1.5.1 Definition of "engine" and provisions related to partially complete engines

What Commenters Said:

EMA commented that the NPRM proposes a number of changes to Part 1068 which extend well beyond Small SI engines. Many of the proposed changes are technical clarifications or corrections to existing programs, and have been previously discussed with the affected regulated entities. While EMA has some comments on those technical clarifications, they have no objection to their being finalized in this rulemaking. Other changes are significantly more substantial and raise major new issues which have not been thoroughly discussed with the affected stakeholders. For example, EPA appears to be taking action, in the guise of a definitional change, which will substantially change the existing requirements for all nonroad engine service parts and engine rebuild practices.

EMA and its members have no objection to working with EPA to better understand the issues that EPA is trying to address and, if necessary, to develop appropriate regulatory guidance. However, EPA should not adopt regulatory changes that will impact aftermarket engine service parts and engine rebuild practices and programs, without a separate rulemaking and adequate notice and opportunity for discussion, analysis and comment by all stakeholders. In that regard, EMA noted that the Nonroad Tier 4 rulemaking was developed, with tremendous success, by an extraordinary level of cooperation and outreach by and between EPA and all of the affected stakeholders. EMA finds it odd that EPA would now try to adopt rules that significantly impact nonroad engines without a similarly thorough level of outreach.

EMA commented that EPA's proposed definition of an engine - a cylinder block plus one component - is not viable and, as a real-world matter, cannot be implemented practically. EMA understands that EPA has raised concerns about its ability to enforce standards if uncertified, incomplete engines enter into commerce. However, the proposed definition is not a viable means to address the concern. EMA noted that it is common for manufacturers to utilize global product manufacturing processes for engine parts, including engine cylinder blocks. Therefore, it is common practice for cylinder blocks manufactured outside of the U.S. to be imported into the U.S. for future assembly. In many cases, those cylinder blocks include additional parts depending on the economics and universal nature of the features. It is not uncommon for the same engine block assembly to be utilized in new engine manufacturing of products certified in different product categories or for use as repair parts for older engines already in service. EMA also commented that the proposed definition of a "partially complete engine" further compounds the confusion regarding the definition of an engine because it is inconceivable that an incomplete engine has substantially more parts than an engine (as would be the case pursuant to the proposed definitions). EMA believes the proposed definitions clearly require significant discussion with a broader industry group including both new engine manufacturers and remanufacturers. They believe the proposed new definition should be removed from this rulemaking and deferred to a subsequent process.

NACOO commented that the new wording found in the "engine" definition of section 1068.30 is not clear at all. It appears to be making the statements more than once with the addition of conflicting requirements of a complete engine and incomplete engine (i.e. the third sentence indicates what is not included engine blocks with no attached components). Then the next sentence states "This includes complete and partially complete as follows:" NACOO commented that the way those sentences are written seems to be saying that a complete engine is not an engine. NACOO commented that EPA needs a definition of "Engine Block." They question whether an "Engine Block" is just a block with no crank pistons cams and just an empty cast iron block? They believe it is not clear what the term "Engine Block" means under the proposed regulations.

ISMA commented regarding §§ 1068.260 and 1068.262: It is their understanding from EPA certification workshop discussions that production configuration engines destined for installation in a certified recreational vehicle (e.g., snowmobile) are considered "partially complete engines" under 40 CFR 1068.330. ISMA understands that these engines do not need to be permanently labeled with an emission control information label since they are not by themselves a certified entity – the completed recreational vehicle is. Furthermore such engines are covered by the temporary exemption in 1068.330 when they are imported into the U.S. The engines are designated on the EPA 3520-21 Form using Box F (recreational spark-ignition vehicles or engines) and Box 16 (incomplete engines). A hang tag or other non-permanent means of identifying the engines should be sufficient at the time of import. They would like to be clear that the ability to efficiently import these engines is critical to the snowmobile manufacturers.

MIC commented that there are several cases impacting the MIC member companies, such as:

- importation of engines not subject to stand-alone engine-based certification requirements, that are destined for installation in certified vehicles
- transportation of engines not subject to stand-alone engine-based certification requirements, that are manufactured by a certifying vehicle manufacturer and transported from one of their locations to another
- temporary labeling requirements for these and other circumstances

MIC continued to comment that specific provisions may be needed to address engines used in recreational vehicles and other vehicles certified by EPA. They think the generic language in this section of Part 1068 does not allow proper treatment of the nuances that exist between engine-based and vehicle-based certification categories. Efficient movement of these vehicle components is critical to the success of several MIC member companies.

Arctic Cat commented regarding §1068.262. This section changes the requirements for shipping partially complete engines within the US. They are confused by this section and are still studying its effect on their operations. For example, it is not clear to them how shipments from Arctic Cat's ATV engine factory in St. Cloud, MN to their assembly line in Thief River Falls, MN are affected because in this case no "secondary manufacturer" is involved. Arctic Cat requests additional time to study this section and provide additional comments.

IMPCO proposes that § 1068.262 be removed in its entirety and be re-written and re-introduced at a later date. IMPCO understands EPA's intent behind the proposed language, but it is impractical and will be near-impossible to implement. The main logistical issue is how the engine manufacturer will be able to identify not only the certifying manufacturer, but the engine family name. For example, IMPCO purchases engines through distributors, not from the manufacturer directly. IMPCO questioned how the engine manufacturer can be involved in this process. Additionally, IMPCO noted that they can have two or more different engine families using the same engine. In such a situation, IMPCO questioned which engine family will be used on the temporary label sent from the engine manufacturer.

ECO commented that EPA has proposed to restrict the importation of base engines prior to certification approval. In addressing this issue, it is critical that EPA incorporate flexibility for engine manufacturers that are in the process of certifying engine families, of which the base engine is sourced from outside the U.S. In these instances, the Manufacturer of Records (MORs) are often required to import the base engines and initiate the emission control system upfit process prior to receiving final certification approval. In these instances, it is necessary for EPA to allow MORs importation flexibility for engines that are not completely assembled.

California ARB supports the proposed requirement for partially complete engines to prevent manufacturers from selling partially complete engines as a strategy to circumvent certification procedures. Under the proposed definition, the short blocks or three-quarter blocks without fuel systems would need to be certified. However, EPA's current production line testing, in-use testing, and warranty requirements are not designed for partially complete engines. In addition, EPA allows the large spark-ignition manufacturers to ship partially complete engines to the secondary engine manufacturers without emission-related components in some circumstances. This would make these provisions (1068.240, 1068.255, and 1068.260) difficult to enforce. California ARB thus recommends that EPA prepare certification guidelines on how to certify partially complete engines under different engine categories. Partially complete engines could be designed to use either gasoline or diesel fuel systems and subsequently they might be installed on stationary equipment, on-road vehicles, off-road equipment, or used as replacement engines. Preparing certification guidelines would help in circumstances when it may be difficult for the engine manufacturers to determine the partially complete engines' final destination.

OPEI commented that the definition of engine (in particular "partially complete engine") in section 1068.30 is missing a critical example in paragraph (2). OPEI notes its engines are not considered complete until final carburetor adjustments have been done to bring engine into proper emission and performance compliance. OPEI requests to add subparagraph (2)(vi) as follows: "(vi) An engine that has been assembled (except for final labeling) but has not undergone final carburetor or other tuning to bring it into compliance with manufacturer's specifications and these standards."

For handheld engines, OPEI does not believe that "short blocks" are "replacement engines," and they should not be tested and labeled as such. Their short block consists of the crankcase, cylinder and crankshaft assembly. The block cannot run until the cooling, ignition, intake, carburetor, fuel system and shrouding are put on. Manufacturers sell this block for rebuilding because the cost of the block is less than the cost of the repair. OPEI requests EPA add language that this provision does not apply to handheld engines.

GM commented that they have considered the impacts of EPA's starting proposal. Although the concept of what EPA intends to do is simple, it truly creates a very difficult position for GM, and they suspect their OEM customers as well. GM hoped that they can find a better alternative to accomplish EPA's goals.

GM noted that its current business model works something like this. GM has a portfolio of engines that they offer to their marine customers. All of the engines they offer are partial engines (and GM is the primary engine manufacturer per EPA's definitions). These engines are not capable of running in the as shipped configurations. GM's customers (Mercury, Volvo, Indmar, Flagship, Kodiak, PleasureCraft and Marine Power) need to do an extensive upfit to "dress" these engines for the final boatbuilder - these customers are the "secondary engine manufacturers." The value added by these customers is significant and includes intake and/or exhaust manifolds, fuel systems, accessory drive, cooling systems, engine controllers and wire harness, etc. In all cases, GM is not the Manufacturer of Record, the Secondary Engine Manufacturers are.

The engines GM offers are based off automotive variants and may include some unique marine hardware. GM may make multiple variants (flavors) of the same engine to meet customer applications differences (ex: sterndrive vs. inboard). They note this does create a proliferation of engine assemblies they offer and their manufacturing plants / logistics operations need to deal with this proliferation - of course, at a cost. As an example, today (2008) GM builds 5 variants of the 5.7L (350 cubic inch) marine engine. Key differences include:

With vs. without intake manifold and fuel system
Front ring gear (sterndrive) vs. Rear ring gear (inboard)
Partial ignition system vs. no ignition system
Mechanical throttle body vs. Electronic throttle body

Thus, GM's engineering release and engine plant have 5 part numbers (P/N's) to deal with. An engine assembly P/N is required for each unique parts list for the final shipped product. GM noted that because most of their marine customers use more than one type of engine from this 5.7L family, this would create the need to create a very large number of labels - an extreme would be 5 engines x 7 customers = 35 labels. This would also require the GM system to replace the 5 engine assemblies with 35 engine assemblies - and that's just the 5.7L at one plant. GM continued to comment that obviously EPA can see the initial burden. This would significantly affect GM's flexibility as today they can ship the same engine P/N to any of the customers who order that particular part number. This could be compounded more as the customers may sell globally (GM doesn't know if the engine is for sale in US or exported). Some engines may be used by their customers for their service needs.

GM requested EPA to consider an option. They referenced some of EPA's initial verbiage: "Manufacturers may introduce into US commerce, partially complete engines as described in this section if they have a written request for such engines from a secondary engine manufacturer that has certified the engine and will finish the engine assembly." GM questions whether this could be interpreted that if a secondary engine manufacturer requests (via purchase order) to procure an engine from a primary engine manufacturer a specific P/N - then this would be sufficient to meet EPA's needs. GM noted that the engine will have engine P/N and broadcast codes, as well as information on the bill of lading where the engines come from. The secondary engine manufacturer could possibly also include in the PO any references as to engine family and certification intents. GM commented that EPA needs to discuss this issue with a broader group of affected companies.

EMA commented on draft regulatory language allowing the movement of partially complete engines between different locations of the same parent company to affirm the principle and request that we clarify that current business practices are not required to change substantially and additional product identification or labeling are not required.

EMA also suggested that the regulations allow engine manufacturers to ship partially complete engines before a Certificate of Conformity is approved. This may also be covered by the manufacturer-owned exemption and/or test exemption.

In later comments, GM emphasized that they wanted to avoid labeling partially complete engines or, if labels are needed, to be sure that GM's label is generic enough that they would not need to identify the destination or a valid engine family name on the label. Putting the receiving company's name and address on the bill of lading is acceptable, but the bill of lading should not need engine family names. GM also objected to any provision that would put them in a position of ensuring that secondary engine manufacturers have a valid certification or exemption that allows them to receive shipment of partially complete engines. In addition, GM raised questions about how the regulations would allow for shipping engines for which the secondary engine manufacturer has an exemption (testing, replacement, etc.), and for secondary engine manufacturers to ship engines to each other (such as for managing excess inventory).

The Industrial Truck Association asked for clarification regarding engines that qualify for the manufacturer-owned exemption or the test exemption. They especially wanted to know how to apply the provisions of §1068.262 for engines that are exempt for other reasons.

IMPCO noted that in certain cases, the equipment manufacturer purchases the engine and aftertreatment. This is effectively a pass through where they charge for the fuel system and installation, but are neither involved with the acquisition nor do they factor the cost of the engine or aftertreatment directly into the cost of the certified engine. Given that these are not test engines, they are not the certificate holder, and they will never be the certificate holder, IMPCO question how the equipment manufacturer would acquire these engines from the engine manufacturer. Also, the regulation should not require the manufacturer to state unconditionally that engines will comply with applicable regulations in their final configuration. As with § 1068.261(j), the certifying manufacturer cannot be held liable for engines that are not in their final configuration when installed in the equipment, unless the certifying manufacturer was in some way negligent when it comes to specifying part numbers, installation instructions, etc. Allow the manufacturers to include qualifying language in their statement to recognize the equipment manufacturers' need to follow installation instructions.

IMPCO further commented that the proposed language related to revoking the exemption seems to allow EPA to revoke the exemption for the secondary engine manufacturer in its entirety. Therefore, IMPCO questioned whether EPA would have the authority to stop shipment of all GM engines to IMPCO, even if the noncompliance only occurred with one engine family. Given the liability placed on IMPCO for items that are outside of its control, IMPCO commented that EPA should have to prove the noncompliance on an engine family-specific basis. They believe this paragraph is too general and too far-reaching. Finally, IMPCO questioned what it means to say: "if that manufacturer sells engines that are not in a certified configuration". IMPCO noted that when engines are shipped without aftertreatment or other components, they are all "not in a certified configuration."

Letters:

Commenter	Document #
ISMA	0671
IMPCO	0692
MIC	0701
Arctic Cat	0709
NACOO	0714
ECO	0712
California ARB	0682
OPEI	0675
EMA	0691
GM	0747
EMA	0809
GM	0787
Industrial Truck Association	0800
IMPCO	0812

Our Response:

At the time of the proposal, it became clear that manufacturers had somewhat varying interpretations of regulatory provisions related to partially complete engines. To the extent that manufacturers took the view that partially complete engines were not subject to emission standards, we understand that our proposed language to clarify the definition of "engine" would be a very meaningful clarification regarding the scope of EPA regulations. We believe it would be reasonable to consider the proposed definition (or a variation of it) to be the proper interpretation of regulatory requirements that were adopted earlier. However, we understand that manufacturers may not have been operating with that understanding. The proposal included a description of the concerns that led us to make this change, in particular the need to address the prevailing practice of shipping short blocks and long blocks to secondary engine manufacturers for certification as Marine SI engines and to address the increasing occurrence of noncompliant imported engines.

We believe it is both necessary and appropriate to finalize the new definitions in this rulemaking. We received extensive input from a wide range of manufacturers during and after the public comment period on these issues, and have provided updated draft regulatory language to manufacturers representing other industry sectors. While the clarified scope of the regulation is broader than some manufacturers have understood to be the case previously, we have been careful to include exemption provisions to avoid unwarranted disruption of a wide range of legitimate business practices related to assembling and distributing engines.

We agree with the manufacturers' comments that the proposed definition of "engine" (block plus one attached component) was too broad. In particular, the first attached components may be dowels, pins, bushings, or plugs, none of which are fundamental to initiating the engine-assembly process. Discussions led us to conclude that installation of the crankshaft serves as a clear, objective, and fundamental point in the production process that can be considered as the time when the engine block becomes an engine (when the engine is "born"). As a result, we will consider engines subject to standards in any case where an engine block has an installed crankshaft, whether or not there are any additional components attached or assembled. This means that each one of these “engines” that is introduced into U.S. commerce needs to be covered by a valid certificate of conformity or an exemption (temporary or permanent). This approach applies equally to handheld engines, locomotive engines, and everything in between.

We note in the definition that there are two types of engines—complete and partially complete engines. This is intended to allow for the situation where special exemption provisions apply for engines that are not yet in a certified configuration. Engines needing carburetor adjustments represent one possible example of that; however, this does not change the fact that we find it necessary to consider these partially complete engines to be subject to standards. See the discussion below regarding date of manufacture for further discussion of issues related to the flow of products and stages of assembly.

We agree with the commenter that fully operational engines intended for installation in a recreational vehicle should be considered partially complete engines under the regulation. The rulemaking changes clarify these relationships and add a variety of oversight provisions (such as labeling, consistent with what was recommended) to prevent circumvention of the regulations. The provisions currently in §1068.330 are being expanded and codified in §1068.262. We believe this approach should be a minor change from current practice for companies currently buying engines for installation in their certified recreational vehicles. Nevertheless, we understand that manufacturers may need time to adapt their ordering and shipping practices to follow these new requirements. The definition of engine and the corresponding provisions related to partially complete engines take effect immediately once the final rule is effective. We are therefore specifying in §1068.40 that manufacturers may have up to 12 months to comply with new requirements. In the case of §1068.262, we are giving advance approval for waiving the documentation and tracking requirements related to partially complete engines.

For the particular question about certificate holders shipping a partially complete engine from one plant to a different plant within the company, we address this in §1068.260 by specifying simply that manufacturers should notify us in their application for certification that they will be shipping these partially complete engines to another of their facilities. An approved certification represents an approval of the exemption that would allow for this transaction. No labeling or additional recordkeeping requirements apply. We learned that some companies rely on third-party companies to arrange for inventory and transport of engines even if they are shipping the engines between two of their own facilities. Sometimes this even involves transferring ownership of the engines to the other company. We chose to address this by adding a provision allowing for third-party companies to be involved in these engine shipments, as long as the certifying manufacturer demonstrates that the engines will be transported only according to its specifications. These provisions are intended to allow manufacturers to continue current practices, but we would not agree that manufacturers should be able to continue their current practices if they do not conform to these minimal requirements. Since the certificate-holder controls these engines at all times, there is no need for labeling or other identification beyond what the manufacturer would do for its normal business practice.

We have made some revisions to the exemption provisions in §1068.262 for shipping engines to secondary engine manufacturers that certify the engines. First, we specify that the documentation must identify a valid engine family name for the particular engine model. The secondary engine manufacturer would simply pass along this information when ordering the engine. The family name could represent a marine, industrial, or stationary application. The shipped engines would not all need to be built up to match the given engine family. For example, the secondary engine manufacturer could provide a valid family name for an order of 4.3-liter engines, then build those engines to be covered by that certificate, or any other certificate. These engines could also be covered by an exemption (for export, for example). Such an exemption must be approved before the original engine manufacturer may ship engines under the provisions of §1068.262. Second, we specify that the removable label may be simplified to include only the shipping manufacturer's name, a statement that the engine is being shipped to the certifying company, and a reference to the bill of lading. This allows the shipping engine manufacturer to make a universal label that would apply for all the engines it produces and ships under these provisions. Third, we are allowing manufacturers to apply a single label to engines that are packaged together. For example, if 30 Small SI engines are shipped in a pallet-mounted box, the manufacturer may label the box instead of labeling the engines individually. Fourth, we are including provisions allowing manufacturers to ship engines to secondary engine manufacturers while an application for certification is pending. This would allow secondary engine manufacturers to start producing engines after sending an application for certification. This is similar to what we allow for other manufacturers; see Section 1.5.1 for general provisions that apply for these early-production engines. Fifth, we have revised the requirement for secondary engine manufacturers to make an unconditional statement of compliance. The revised statement attests that the manufacturer has distributed engines that conformed to the regulations, rather than attesting that the engines in the final configuration will be compliant. This focuses the secondary engine manufacturer's statement on the activities it can control. Sixth, we have revised the regulation to specify that it is a violation "if that manufacturer sells engines that are not in a certified configuration <u>in violation of the regulations</u>." This avoids the confusion that might arise from the provisions related to selling engines without aftertreatment devices under the delegated-assembly provisions.

The final rule does not include a requirement for original manufacturers to include engine family information on the engine label or on the bill of lading. We believe the documentation provisions related to ordering the engines and the requirement to ship the engines directly to the secondary engine manufacturer should be sufficient to ensure that engines reach a certified configuration before reaching the ultimate purchaser. However, this reduced information on the label requires that we specify that the original manufacturer assumes some responsibility for ensuring the validity of the information specified by the secondary engine manufacturer. Accordingly, we specify that we may void the original engine manufacturer's exemption if the engines are shipped to the wrong destination or if engines are not properly labeled.

The language describing how EPA might revoke the exemption generally applies to a secondary engine manufacturer's engine family, but we clearly should be able to void or revoke an exemption more narrowly or more broadly if available information allows us to identify how specific the violation is. For example, we may void or revoke the exemption with respect to a particular engine model or for all engine models shipped to the secondary engine manufacturer, depending on whether or not the violation is unique to a particular engine model. We may also void or revoke the exemption from the original engine manufacturer with respect to a single secondary engine manufacturer or all affected secondary engine manufacturers, depending on whether or not the violation is unique to a particular secondary engine manufacturer.

We believe the final regulation and the guidance contained in rulemaking documents provides sufficient guidance to implement the new provisions. We will expect to interact extensively with companies as they follow these requirements and will be prepared to publish any necessary clarifications as the need arises. In particular, our understanding is that most of the exemption provisions related to partially complete engines are temporary, which means that the normal requirements (production-line testing, warranty, etc.) will all apply at a later point in the assembly and distribution process. The provisions for handling short blocks as replacement engines are permanent exemptions, but this is consistent with the way we have handled exemptions for complete replacement engines in the past.

Note that we are adding a new §1048.601(b) to describe how the replacement-engine provisions of § 1068.240 apply for engines subject to part 1048 in conjunction with the secondary engine manufacturer provisions in § 1068.262. For cases in which the secondary engine manufacturer completes assembly of the engine, these provisions apply as written. If the secondary engine manufacturer arranges for a third party to complete engine assembly, some additional provisions apply. Most significantly, the ultimate purchaser must purchase (or otherwise order) the replacement engine from the secondary engine manufacturer, and the secondary engine manufacturer and engine assembler are both responsible if the engine is installed in new equipment or otherwise violates the circumvention provisions of § 1068.240.

1.5.2 Definition of "date of manufacture" and issues related to "model year"

What Commenters Said:

EMA commented that EPA is proposing a significant regulatory change – not a clarification – that would define an engine's date of manufacture based on when the engine is capable of running or on when an incomplete engine is imported to the U.S. This significant change is both unwarranted and misguided. EPA's proposed change will alter the way in which manufacturers currently operate, will impose significant costs and administrative burdens, and will not provide any emission benefit. Indeed, EPA has not identified any "problem" that it is attempting to solve. The fact of the matter is that EPA's new definition will create problems.

EMA continued commenting that under EPA's rules, a manufacturer on a calendar year model year (which is the vast majority of manufacturers) cannot produce an engine for the current model year after December 31 of that model year. However, EPA's proposed new rules would require the manufacturer that begins production of an engine in one model year to meet the regulatory requirements of the next model year (when the engine can actually run or when the incomplete engine is imported). That is wrong and unfair. It is obvious that, as a practical matter, an engine built on December 31st could not run or would not be imported until January 1st. So, the December 31st engine would either have to be built to the next model year's standards, or it could not be sold. It is just as obvious that such a scenario could occur for engines built on December 30th, and probably for all of December, and, indeed, for engines built even earlier in that model year. The nature of the manufacturing process, exacerbated by the location of engine plants throughout the world and the non-integrated nature of the industry, makes EPA's proposed new date of manufacture definition not only impractical, but likely impossible.

EMA commented that manufacturers cannot live with a rule that prohibits them from assigning the date of manufacture at the point within the engine assembly process that is relevant to their specific manufacturing workflow. The assignment process established for a given manufacturing facility does not (and should not) change from day to day or from the beginning to the end of a model year. For products that are imported as incomplete engines, the date of manufacture likewise is determined and assigned during the manufacturing process - - a timing and process that is independent of shipment and importation.

EMA continued that to a large degree, EPA's proposed change seems to be a "solution in search of a problem." Certainly, for those model years where there is no change in standards (i.e. most model years), the potential for somehow "gaming" the system around defining the date of manufacture simply does not exist. But, even for those model years in which there is a change in standards, any potential for "gaming" can be eliminated by EPA simply requiring that whatever process and procedure the manufacturer uses for establishing date of manufacture remain constant for an engine family throughout all of its model years.

Finally, EMA noted that engine manufacturers are required to control inventory of either in-process engines, or incomplete engines being imported, to normal levels through both EPA anti-stockpiling requirements and also normal business practices. Accordingly, manufacturers should be allowed to maintain their current production process for the determination of the engine date of manufacture.

OPEI commented that the definition for Date of Manufacture in section 1068.30 is too obscure. Paragraph (1)(i) of the definition has a very narrow interpretation. An engine being able to run is different than an engine set to run properly for emission and performance. OPEI suggests this wording be revised as follows: "The date on which the engine is assembled and adjusted to the point of being able to properly run for compliance to these standards."

OPEI also commented that EPA should clarify section 1060.201. The certificate of conformity will list an effective date (signature date). The manufacturer may not introduce into commerce before this date but may produce equipment/engines prior to the effective date.

California ARB recommended that procedures be adopted to prevent any stockpiling of engines that could be used to circumvent the regulations.

OPEI/EMA suggested that EPA clarify the allowance for equipment manufacturers to use up inventories of previous MY engines, adding an allowance for engine manufacturers to sell engines that they had built in the previous MY.

IMPCO commented that §1068.103(c) appropriately allows for production of engines while an application for certification is pending, but the regulation should prohibit introduction into U.S. commerce only rather than also prohibiting the selling and offering to sell such engines.

Manufacturers also raised a variety of issues related to our proposal to adopt certain restrictions on naming an engine's model year for importation, as described in Section 2.10.3.

Letters:

Commenter	Document #
OPEI	0675
EMA	0691
California ARB	0682
IMPCO	0812

Our Response:

Until now, the regulations have not specified the point in the assembly process that should serve as the basis for establishing an engine's date of manufacture. For the large majority of engines, this is not an issue, since total assembly time from start to finish is measured in hours or perhaps days. As a result, it is relatively uncommon for there to be any uncertainty regarding an engine's date of manufacture for purposes of deciding which standards apply. Nevertheless, we have learned that there are widely diverging practices for establishing an engine's date of manufacture, which means there is a different effective date of new emission standards for different manufacturers. This is especially of interest for larger engines, which are more likely to be assembled in multiple stages at different facilities. We believe it is important to establish a clear requirement in this regard to avoid ambiguity and different interpretations. A consistent approach preserves a level playing field and may prevent some manufacturers from manipulating their build dates to circumvent the regulations.

We expected that the proposed definition of "date of manufacture," based on reaching a final, running configuration, was the most straightforward and logical interpretation. The comments received and the ensuing discussions made clear that this interpretation was not universally held. The diversity of views underscores the need for the regulations to establish a clear and uniform requirement. Once we are able to establish such a requirement, we believe there would be a "cost and burden" only for those companies that would otherwise be attempting to delay complying with new emission standards. Requiring only that manufacturers continue their normal business practice or maintain a consistent approach from year to year would not do enough to establish uniform and enforceable requirements related to the transition to new emission standards.

However, we recognize the concern that manufacturers need a rather high degree of certainty regarding applicable emission standards when they initiate assembly of an engine. Any number of variables in the production process could affect how long it takes to finish building an engine. We therefore believe it is most appropriate to match up the definitions for "date of manufacture" and "engine" by specifying that an engine's date of manufacture should be based on the date that the crankshaft is installed in the engine. This provides manufacturers with the control they need to determine which emission standards apply when they start to build the engine.

We are aware that secondary engine manufacturers may have inventory and assembly procedures that are not tied to the actual date of crankshaft installation by the original engine manufacturer. We are therefore specifying for this situation that the date of manufacture is generally the date the secondary engine manufacturer receives shipment of the partially complete engine. The manufacturer may alternatively specify a date of manufacture up to 30 days earlier as long as that date is not earlier than the date the crankshaft was actually installed in the engine. This puts the secondary engine manufacturer in a similar position relative to companies with sole responsibility for assembling complete engines, without placing unreasonable expectations on secondary engine manufacturers.

Some manufacturers would be interested in naming a date of manufacture that is later than we specify in the regulation, as suggested in the comments. This may be for marketing purposes, managing inventories of engine components, or for other recordkeeping or product-development reasons. There is no risk of manufacturers gaining an advantage of being subject to less stringent standards by delaying the date of manufacture for an engine, so we would have no objection to that. However, we limit the selection of date of manufacture to a later point <u>in the assembly process</u>. Selecting a date of manufacture after the end of the assembly process for an engine would raise concerns about the risk of manipulating emission credits for a given model year and about ensuring that engine assembly and dates of manufacture are always within the production period established for a given engine family, as described in the certificate of conformity or the manufacturer's records. We see no legitimate reason to select a date of manufacture after completing assembly for an engine.

This approach addresses manufacturers' concerns for knowing which standards apply to an engine, but we are concerned that manufacturers could ramp up production of engine blocks with installed crankshafts as a method to delay compliance with new emission standards. EPA regulations have always included provisions describing limits on inventory and stockpiling practices for equipment manufacturers. The regulations until now have not clearly addressed issues related to stockpiling for engine manufacturers. We agree with the suggestion from commenters that anti-stockpiling provisions would be appropriate. The Clean Air Act contemplates the need for such provisions in §202(b)(3) where there is direction for EPA to consider establishing a definition of model year that prevents stockpiling. At the same time, we received other comments related to production periods and model year, leading us to adopt a collection of related provisions in §1068.103.

The new text in §1068.103 includes three main provisions that are already in place for motor vehicles and heavy-duty highway engines in §§85.2304 and 85.2305. First, we are clarifying that the scope of a certificate of conformity may be limited to established engine models, production periods, or production facilities. Any such limits would be included in the manufacturer's application for certification or in the certificate of conformity. Second, we are defining the limits on selecting production periods for purposes of establishing the model year. Third, we are clarifying that engine manufacturers may start producing engines after they submit an application for certification and before the certification is approved. This includes provisions to address the manufacturers' responsibility to ensure (1) that engines are not introduced into U.S. commerce or offered for sale until the certification is approved, (2) that all engines are assembled consistent with the certification, including any changes that may have come from the certification review process, and (3) that manufacturers make these early-production engines available for production-line testing or selective enforcement audits, as appropriate.

In addition, we are adding provisions to establish limits on stockpiling for engine manufacturers. We are doing this by stating that manufacturers must use their normal inventory and assembly processes for initiating assembly of their engines. We include a clarifying expectation that we would expect normal assembly processes to involve no more than one week to complete engine assembly once the crankshaft is installed. We understand that assembly processes in some cases are more complicated, and that engine manufacturers may be unable to complete engine assembly in some cases based on delivery of certain components. To put some boundaries on these exceptional situations, the regulation specifies a presumption that the engine manufacturer has violated the stockpiling prohibition if engine assembly is completed more than 30 days after the end of the model year. This presumption date is 60 days after the end of the model year for engines with per-cylinder displacement above 2.5 liters. This generally distinguishes engines that may have relatively high sales volumes (including heavy-duty highway engines) from bigger engines that are only sold in lower sales volumes.

Two additional provisions are intended to minimize potential burden and disruption related to transitioning to new model years. We specify that the restrictions related to date of manufacture and model year do not apply if there is no change in emission standards for the coming model year. We are also including hardship provisions to allow manufacturers to request approval to extend the final assembly deadline for their engines if circumstances outside their control prevent them from completing engine assembly in time. We would approve such a request only if the manufacturer could not have avoided the situation and took all possible steps to minimize the extent of the delay.

Note that we are also clarifying in the standard-setting parts that the certificate is valid starting with the indicated effective date, but that it is not valid for any production after December 31 of the model year for which it is issued. We are also adopting a provision to preclude issuance of certificates after December 31 of a given model year. This will avoid a situation in which a manufacturer receives certification after it is no longer valid for further production.

Finally, note that we are adopting a provision specifying that imported products may not have a model year more than one year earlier than the calendar year of importation, as described in Section 2.10.3. We proposed this in part 1054 for Small SI engines and requested comment on including it in part 1068 for all nonroad engines. Manufacturers generally had no objection to expanding the scope of this provision to other categories of nonroad engines. We are therefore adopting this provision in §1068.360.

We understand Impco's interest in making arrangements to sell engines once they have submitted an application for certification for a given engine family. However, making such commitments to supply products before the certification is approved would put EPA in an difficult position if the application included significant shortcomings. If the manufacturer would need to do further testing, modify the engine design, or make other changes to adequately demonstrate compliance with applicable requirements, there could be substantial delays in the certification process. During this time, the manufacturer would likely insist on accelerating the approval because of their premature business commitments. We believe this could interfere with the normal review process. Furthermore, the Clean Air Act prohibits selling or offering to sell engines that are not yet covered by a certificate of conformity, so it is not clear how we could create such an allowance that is consistent with the Act.

Finally, we note that we are adding a new paragraph to §1054.601 to clarify how engine manufacturers can sell engines after the end of the model year. This text does not change the prohibition in 40 CFR 1068.103(f) against engine manufacturers deviating from normal production and inventory practices to stockpile engines with a date of manufacture before new or changed emission standards take effect. It does add a requirement that manufacturers get our prior approval for model years in which emission standards change if their normal practice for producing engines includes maintaining engines in inventory for some engine families for more than 12 months. Manufacturers would be required to show that this is necessary and consistent with their normal business practice. They would also be required to include relevant inventory and production records from the preceding eight years.

1.5.3 Retailer liability

What Commenters Said:

OPEI shares EPA's concerns that many U.S. importers, distributors and retailers currently do not fully appreciate that they can be found responsible and liable for selling non-compliant small engines. Section 203(a) of the CAA prohibits any "person" "causing" the importation of non-compliant or uncertified engines or vehicles. U.S. retailers that purchase non-compliant or uncertified engines from an importer may be found responsible for "causing" the importation of illegal products. The final regulations and preamble discussion should make it clear that retailers selling non-compliant products may be subject to the enforcement provisions set forth in Sections 113, 204 and 205 of the Clean Air Act.

Analogous case law holds that retailers act as de facto “importers” if they are inducing and causing the importation. See Terry Haggerty Tire Co. v. United States, 899 F.2d 1199 at 1200 (Fed. Cir. 1990). In this case, the Court found that a tire retailer, who merely purchased goods from a Canadian company, but did not arrange for or participate in the shipment or importation of the goods, had caused the sale sufficient to be held as the importer.

In California, retailers and distributors, as well as equipment manufacturers, are potentially “strictly liable” for offering for sale or selling non-compliant small-engines or lawn and garden equipment. In assessing liability, California ARB looks at each individual case to determine which parties were principally at fault in causing the violation. California ARB’s general enforcement policy has been to not impose penalties on innocent manufacturers or retailers who undertook “reasonable prudent precautions” to ensure they are selling certified and compliant products. However, if, for example, a retailer purchased products that are less than half of the purchase price of the normal, low-end range of a certain category, California ARB will question whether that retailer failed to take any precautions whatsoever, and should have known he was buying suspect, non-compliant products. The California ARB enforcement approach has provided a much-stronger deterrent than the current EPA program vis-à-vis the offering for sale of non-compliant products.

In response to EPA's concerns about duplicative certifications being filed, even the equipment manufacturers, retailers and distributors that have received substantial penalties under California ARB settlements are not re-testing or re-certifying products with an emission label. However, these retailers are incentivized to buy compliant products from reputable, rather than "fly by night" companies, and to contractually require their suppliers to sell only certified and emission-compliant products, subject to indemnifications for any violations. EPA should develop policies that will achieve these same incentives in the national marketplace. OPEI urges EPA to pull ahead and make effective in 2007 the regulatory clarifications that retailers and distributors that "cause" a prohibited act are potentially liable parties.

In addition, various OPEI member companies sent in separate letters encouraging us to take a position consistent with the OPEI recommendations described above.

Letters:

Commenter	Document #
OPEI	0675
Stihl	0767
Honda	0767
John Deere	0767
Briggs & Stratton	0767

Our Response:

We agree with the suggestion from OPEI to include in the regulations a clear statement that we consider it a violation to cause someone to commit a prohibited act. The preamble to the final rule also describes the basis and context we would consider for evaluating possible "causation" violations.

1.5.4 Defect reporting

What Commenters Said:

OPEI appreciates the changes for defect reporting and believes that the changes have leveled the requirements between large and small volume manufacturers with no negative impact on the environment. OPEI also agrees with the effective date of 2009 for Small SI.

MIC commented that § 1068.501(a)(1)(ii) should be modified to delete the reference to "connectors" for which no permeation standards or test procedures have been defined.

GE commented that EPA should not extend the tracking requirements for other nonroad engines regarding defect investigation and reporting to locomotives and locomotive engines but should instead retain the approach currently used under part 92. GE also restated detailed comments made during the recently finalized locomotive rulemaking.

Letters:

Commenter	Document #
GE	0679
MIC	0701
OPEI	0675

Our Response:

We disagree with the comment from MIC to eliminate fuel line connectors from the list of evaporative emission components subject to defect reporting. While we do not have separate emission standards for connectors, defective connectors have the potential to result in emissions just as significant as defective fuel lines. By including them on the list we are merely requiring that the manufacturer investigate defects when they become aware of them and report them to us. This is not an overly burdensome requirement.

GE's comments were addressed in the locomotive rulemaking by revising the reference to §1068.501 in 40 CFR 1033.601.

1.5.5 Delegated assembly

What Commenters Said:

EMA commented, and as they have discussed their comments with EPA at length, that the existing delegated assembly provisions applicable to land-based nonroad engines are inadequate. Because they include a provision not found in any other mobile source regulation – the mandatory requirement to include the price of the aftertreatment with the price of the engine, they create a major economic penalty for manufacturers. By requiring the price of the aftertreatment to be included in the price of the engine, importers have to pay an import duty on the price of the aftertreatment even if the aftertreatment is manufactured in the United States. Similarly, for aftertreatment systems that are imported separately from the engine, the duty is paid twice. The proposed allowance for importers to segregate the cost of the separately shipped components to avoid duplicate duties is not acceptable and, in any event, is not within EPA's regulatory authority.

EMA continued to comment that it is not fair, appropriate or necessary for EPA to impose this requirement on land-based nonroad engines. In fact, EPA currently provides an option in the delegated assembly provisions applicable to heavy-duty on-highway engines. Manufacturers either can include the price of the aftertreatment with their engine, or they can opt to exclude the cost of the aftertreatment and meet certain audit requirements. EPA should finalize a similar provision for nonroad engines. In addition, nonroad engine manufacturers should be provided with the delegated assembly flexibility being proposed for Small SI engine manufacturers associated with the sale of engines through distributors.

EMA commented that both of the changes recommended above are needed and appropriate for land-based nonroad engines and can be implemented by EPA within the scope of the existing regulatory process.

In response to draft regulations that address the concerns described above, EMA suggested clearer language stating that air filters are not subject to delegated-assembly requirements if they are not specified by part number in the manufacturer's application for certification.

EMA (0738) commented that we should include preamble language to clearly describe when air-intake systems are subject to delegated-assembly requirements. They also requested that we delay the labeling requirements associated with delegated assembly for heavy-duty highway engines until 2010. In addition, they requested that we not require manufacturers to investigate assembled engines after an initial, successful audit.

IMPCO requested that we clarify what records would be appropriate for showing that parts were randomly collected to prepare for production-line testing with engines that participate in delegated assembly. They also objected to the requirement for the certifying manufacturer to get written confirmation that an equipment manufacturer has ordered the appropriate aftertreatment devices and to the inclusion of air filters in the delegated-assembly provisions. They believe these provisions are redundant with all the other requirements for documentation and verification.

IMPCO commented that revoking the exemption should be narrowly related to the equipment manufacturer and engine family that were the subject of a violation. They also objected to the regulatory provision assigning liability for in-use compliance to the engine manufacturer, stating that it would be irrational to expect the engine manufacturer to be responsible for anything past delivery to the equipment manufacturer, assuming the auditing and other applicable provisions have been followed.

EMD provided comments arguing against applying the proposed §1068.260 to locomotives. They also opposed applying §1068.260(b)(4) and (b)(6) to C2 marine engines.

Letters:

Commenter	Document #
EMD	0687
EMA	0691
EMA	0738
EMA	0818
IMPCO	0812

Our Response:

It is important to begin by emphasizing that the delegated assembly provisions do not represent additional requirements, but rather are voluntary provisions intended as a flexibility to manufacturers. With respect to liability, we expect engine manufacturers to take appropriate "steps to ensure that all engines will be in a certified configuration when installed by the equipment manufacturer." Manufacturers that do not believe they can effectively ensure that engines are in a certified configuration when installed by the equipment manufacturer should not use these delegated assembly provisions. We believe that holding engine manufacturers liable for the final assembly is the best way to ensure they take appropriate steps to prevent problems.

We do not agree that pricing engines and aftertreatment together is an unreasonable requirement. In fact, it is not a regulatory requirement under the current program as much as a constraint on exercising an allowance to depart from regulatory requirements. If the pricing provisions are more burdensome than shipping engines with aftertreatment devices, then manufacturers could simply choose not to participate in delegated assembly. For those manufacturers wanting to pursue delegated assembly, we believe the pricing requirement is important in preventing vehicle or equipment manufacturers from being in a situation where they would gain a financial advantage by installing engines without the proper emission controls in place. We have confirmed with the U.S. Customs and Border Protection that inappropriate payment of import duties for components that are not shipped with a given engine can be avoided with documentation showing that the price of the engine includes a charge for components that are not included in that particular shipment. This could most easily be accomplished by itemizing the invoice to identify the value of the missing components relative to the value of the rest of the engine. The regulations now include these specific instructions regarding invoicing with respect to import duties.

We understand that engine manufacturers have competing interests both to maintain the ability to arrange flexible assembly procedures and agreements, and to ensure that their engines are introduced into commerce only after being assembled in the certified configuration. We share those objectives and believe the regulations serve the purpose of creating a framework for balancing these different concerns. By applying these provisions in the regulations, manufacturers will not find themselves in a situation where competitiveness concerns cause them to take steps to reduce costs at the risk of producing noncompliant products.

We agree with EMA, however, that it would be appropriate to apply the delegated-assembly framework for heavy-duty highway engines to other nonroad engines. The main difference between programs is the allowance for heavy-duty highway engines to rely either on the pricing strategy described above or on audits of vehicle manufacturers, but not necessarily both, to ensure that installed engines are in the certified configuration. While we are concerned about the incentive for vehicle and equipment manufacturers to gain a financial advantage if aftertreatment components are not priced together with the engine, we believe that requiring engine manufacturers to confirm that vehicle or equipment manufacturers have ordered the required aftertreatment components and to perform audits of vehicle or equipment manufacturers is generally sufficient to provide the proper assurances that engines are being properly assembled and installed. Conversely, we believe that pricing aftertreatment and engines together is a strong enough assurance of proper assembly and installation procedures that audits are not always necessary as an additional oversight measure. We note that these provisions spell out a minimum level of oversight for engine manufacturers. There may be instances, such as a new relationship with a vehicle or equipment manufacturer or some other reason to have less confidence in proper assembly procedures, where the engine manufacturer would want or need to take extra steps to ensure that engines are assembled properly.

We recognize the inconvenience of requiring engine manufacturers to obtain written confirmation that the equipment manufacturers have ordered aftertreatment components before shipping the engines. Thus, the final regulations only require this be done for the initial shipment. This will significantly limit the inconvenience, while ensuring that the equipment manufacturers understand their obligations before they start receiving engines.

We believe there is a strong advantage in implementing requirements uniformly across all the engine programs, both for EPA and for manufacturers. Aside from the pricing and auditing requirements described above, we are making the following provisions part of the final program, which were part of one or both of the separate programs in parts 85 and 1068:

- Auditing rates are generally set at four vehicle or equipment manufacturers per year, or enough to rotate through all the equipment manufacturers over a four-year period, whichever is less. A reduced rate may apply after several years of successful implementation of these requirements.
- We are continuing the approach already adopted to provide for a streamlined demonstration for integrated manufacturers where the auditing would effectively be an internal practice.

In addition, we are including the following provisions in the unified approach to delegated assembly that were part of the proposal for Small SI engines:

- Distributors may participate in delegated assembly, but only to the extent that they act as equipment manufacturers, adding aftertreatment devices before shipping the engines to vehicle or equipment manufacturers. Allowing distributors to further delegate engine assembly to another set of companies raises fundamental questions about the ability of engine manufacturers to adequately ensure proper final assembly of their engines. We are making a temporary allowance for this for Small SI engines to accommodate the transitional provisions allowing equipment manufacturers to gradually work toward making Phase 3 products.
- If engine manufacturers design their air-intake systems such that they depend on specific parts (identifiable by part number) to achieve proper air flow through the engine, that raises concerns that are similar to aftertreatment devices. In fact, we are currently pursuing an enforcement case where an equipment manufacturer did not follow the engine manufacturer's directions to use a specific air filter. We are specifying that air filters identified by part number must be included in delegated assembly, though we require audits related to air filters only if audits are already occurring for exhaust systems. If manufacturers specify intake air systems by performance parameters such as maximum pressure drop across the air filter, the delegated-assembly provisions do not apply. This is similar to the way we have treated exhaust components for systems not requiring exhaust aftertreatment. See §1068.260(a).

- Vehicle or equipment manufacturers submitting annual affidavits must include a count of aftertreatment devices received to verify that there were enough of the right models of aftertreatment devices for the number of engines involved.
- Engines need to be labeled to identify their status as delegated-assembly engines, either with a removable label or with "Delegated Assembly" noted on the engine's permanent label. This ensures that engines will not be introduced into commerce without an indication of their status relative to the certified configuration.
- Engine manufacturers must confirm that vehicle or equipment manufacturers have ordered aftertreatment devices corresponding to an engine order, but this confirmation is limited to the initial shipment of engines for a new certification and may occur up to 30 days after the engines have been ordered.
- For engines subject to requirements for production-line testing or selective enforcement audits, we specify that aftertreatment components must be randomly procured. We agree with the suggestion in the comments to broaden the allowance for randomly procuring components. As long as manufacturers use a method to randomly select components that are appropriate for the particular engine configuration, these components may come from any point in the normal distribution chain.

We agree that the labeling requirements are new for heavy-duty highway engines and are therefore allowing until the 2010 model year for manufacturers to start meeting requirements for these engines.

We agree that delegated assembly provisions do not apply for components that are not emission-related. See §1068.260(b). However, we disagree with IMPCO's comment to exclude air filters. Nevertheless, §1068.261(e) describes a less burdensome approach for air filters. We are including preamble language to further clarify the distinction between intake systems that are specified in the application for certification by part number or by performance specification.

We believe it is not appropriate for the regulations to specify that a single audit showing proper assembly procedures is a sufficient basis for discontinuing future audits. We are concerned that engine and equipment manufacturers must have an extended period of complying with these provisions with significant communication, oversight, and verification to ensure that engines are being assembled properly. The regulations in all our programs (proposed and adopted) have specified a reduced auditing schedule only after cycling through two four-year auditing periods. We continue to believe this is appropriate for the universal program.

With respect to production-line testing, we would expect manufacturers to need to keep simple records describing the algorithm used to make the selection.

We have modified parts 89 and 94 to allow manufacturers to use the delegated-assembly provisions and other provisions related to partially complete engines for land-based nonroad diesel engines and marine diesel engines. It is not likely that these engines will be using aftertreatment devices to meet current standards, but there may be circumstances where this may apply. The new regulatory provisions also clarify exemptions and special provisions that apply, for example, for within-company shipments between facilities and for shipping engines without certain engine components.

We acknowledge that manufacturing processes and regulatory requirements for locomotives and locomotive engines warrant special treatment with respect to shipment and assembly of aftertreatment devices. We have therefore adopted such provisions in 40 CFR part 1033 that apply specifically to locomotives instead of the delegated assembly provisions we are adopting in §1068.261.

1.5.6 Engine rebuilding

What Commenters Said:

Cummins requested clarification in the rebuild requirements of Parts 89 and 1039 via Part 1068 that a rebuilt engine may be used to replace any equivalent engine regardless of model year. (i.e. a rebuilt Tier 1 engine may replace a TPEM engine or an AB&T engine (assuming they are identical) of a later model year. They noted that this issue has been raised within Cummins particularly with large engines (>560kW) where there are often times fleets of vehicles that are supported with spare engines owned by either the mine owner or by a Cummins distributor. At the time of engine failure, or rebuild, Cummins believes it is acceptable to replace engines on a "like-for-like" basis regardless of model year. Because of TPEM and AB&T flexibility, the use of the term model year in 1068.120 could be interpreted to not allow this like-for-like replacement. Therefore, Cummins requested a revision to the regulatory language for §1068.120 as noted below. Cummins also commented on §89.1003 and §1068.240, as noted below, and commented that those changes may not be needed given that those sections deal with new replacement engines. However, Cummins commented that they would like EPA to consider those changes as well.

> 1068.120 : Rebuilding
> (f) If the rebuilt engine replaces another certified engine in a piece of equipment, you must rebuild it to a certified configuration of the same model year or Tier level as, or a later model year or Tier level than, the engine you are replacing. In circumstances involving a TPEM engine or an engine certified to a later Tier level using AB&T credits, the engine is considered interchangeable with a previous Tier engine for the purpose of installation in a piece of equipment as long as the engine is identical in all material respects to the engine being replaced.
>
> 89.1003(b)(7) : New Replacement Engines
> (v) Where the replacement engine is intended to replace an engine that is certified to emission standards that are less stringent than those in effect when the replacement engine is built, the replacement engine shall be identical in all material respects to a certified configuration of the same or later model year or Tier level as the engine being replaced. In circumstances involving a TPEM engine or an engine certified to a later Tier level using AB&T credits, the engine is considered interchangeable with a previous Tier engine for the purpose of installation in a piece of equipment as long as the engine is identical in all material respects to the engine being replaced..

1068.240(a)
(5) You make the replacement engine in a configuration identical in all material respects to the engine being replaced (or that of another certified engine of the same or later model year). This requirement applies only if the old engine was certified to emission standards less stringent than those in effect when you produce the replacement engine. In circumstances involving a TPEM engine or an engine certified to a later Tier level using AB&T credits, the engine is considered interchangeable with a previous Tier engine for the purpose of installation in a piece of equipment as long as the engine is identical in all material respects to the engine being replaced.

California ARB encourages EPA to address the status of remanufactured engines as being fully subject to the requirements for rebuilt engines in 40 CFR 1068.120, and to adopt labeling requirements for rebuilt engines similar to those in California's Off-Road Diesel Regulation at 13 CCR 2423(l).

OPEI commented that their units do not have hour meters and an exact hour of use is not always possible. OPEI suggests language in section 1068.120(j)(1) be reworded to indicate approximate hours of use or in-use service time and method used to determine such estimates.

EMA commented that the proposed provisions regarding engine rebuilding are acceptable but incomplete because they do not adequately address the difference between model year requirements and emission standard requirements. In the final rule EPA should clarify that an engine that is rebuilt may be used to replace any equivalent engine model regardless of the model year of the equipment.

EMA recommended that we include a definition for "rebuilding."

OPEI believes EPA may be creating burdens on industry segments unaware of this rule and incapable of providing the amount of burdensome records required by this part. OPEI proposes EPA exempt engines/equipment subject to part 1054 from this provision.

EMA commented that Small SI engines are significantly different than larger engines currently regulated under §1068.120. The listed requirements must either be excluded for Small SI engines or modified to allow the appropriate requirements for Small SI engines.

Letters:

Commenter	Document #
Cummins	0719
California ARB	0682
OPEI	0675
EMA	0691
EMA	0808

Our Response:

We agree with Cummins that the regulations should more carefully address rebuild requirements for special cases such as spare engines for maintaining a fleet, engines with Family Emission Limits above or below the standards, and engines produced under the Transition Program for Equipment Manufacturers. We have revised the regulations in §1068.120(f) to describe how the rebuilding provisions apply under several such scenarios, consistent with the approach recommended by Cummins.

We agree with California ARB that remanufactured engines are generally subject to rebuilding requirements. We note, however, that remanufactured engines might become "new engines," for example, if they are installed in new vehicles or equipment. In this case they would need to be certified before being introduced into commerce like any other new engine. Remanufactured engines that qualify as "new engines" are typically used as replacement engines. As such the provisions for the replacement-engine exemption in §1068.240 would apply, including the labeling requirements, as described in Section 1.5.7.

We agree that the rebuilding provisions should acknowledge that approximate service hours (or miles) are adequate for engines without hour meters (or odometers) and have changed the regulation accordingly.

We agree with EMA that a rebuilt engine may be used to replace any equivalent engine model regardless of the model year of the equipment and have changed the regulation accordingly.

The current regulations include language describing what qualifies (and does not qualify) as rebuilding. Absent any specific recommendations, we believe it is not appropriate to more carefully define what constitutes engine rebuilding. Moreover, the same requirements (except recordkeeping) generally apply for routine maintenance as for rebuilding so we believe it is also not necessary to add this kind of clarification.

We understand the concerns raised by OPEI for small spark-ignition engines. Engine repairs for a single-cylinder engine might involve replacing the piston or piston rings. This should still be done such that an engine remains in its certified configuration, but we agree that someone might easily do this maintenance without realizing that they have triggered a regulatory requirement. This is especially true for lawn and garden applications, but the same dynamic applies for small outboard engines and small engines used with recreational vehicles. We are therefore revising the regulation to waive the recordkeeping requirements for spark-ignition engines below 225 cc. Larger engines are much more commonly used in commercial applications where operators and repair professionals would be more likely to have maintenance and rebuilding practices that resemble those for diesel engines or for larger spark-ignition engines.

1.5.7 Replacement engines

What Commenters Said:

EMA commented that the existing replacement engine exemption was unworkable for partially complete engines. They recommended a separate replacement-engine exemption for partially complete engines, including any engine assembly in which some components necessary for engine operation were missing. They recommended that such engines could be used for replacement purposes with no restriction other than labeling the engines to identify them as “service use only”. They also recommended that we define the terms “replacement engine” *and “destroyed.”*

In response to draft regulatory language describing an allowance for a limited number of partially complete replacement engines without requiring the usual tracking, demonstration, recordkeeping, etc., EMA commented that these provisions should also apply for engines between 2.5 and 7 liters per cylinder, and that they should apply for marine diesel engines. They also noted that the labeling requirements in §1068.265 appeared to be in conflict with the labeling specifications in §1068.240.

ECO responded to questions about industry practices for replacement engines. They described Marine SI manufacturers as sending long blocks out only on an as-needed basis. There are some marinas willing to pay the flooring charges to keep blocks immediately available, but it sounds like this is probably the exception to the rule. Regardless, ECO noted that for the small manufacturers that might sell 200-300 engines per year, the 0.5% allowance is only 1 to 1.5 engines. ECO commented that this is not much. Based on input from Kodiak Marine Parts, ECO commented that 1% would probably be better, as it would give a little extra flexibility.

IMPCO asked whether §1068.240 applies only to engines that are specifically built as replacement engines, or to all engines that might be used as replacement engines, and noted that they do not build replacement engines for engines that are not in production. IMPCO noted, for example, that if the block cracks, the engine would typically be 'replaced' by bringing the piece of equipment to a service facility, the service facility orders an engine (block plus crankshaft) from the OEM or a warehouse, they remove the fuel system components, install the new block, and install the other, used fuel system components. IMPCO also asked how the OEM is supposed to know whether the short block is used for a currently certified engine family. IMPCO noted that the proposed regulations state that the partially complete engine exemption is not valid when engines are shipped to a non certificate-holder. IMPCO questioned whether service engines are covered? Finally, IMPCO also questioned why an exemption is needed to sell a replacement engine from their current production.

IMPCO also asked if an engine produced by a secondary engine manufacturer is considered a New Replacement Engine once assembly is complete at its facility or after it is installed in the equipment. They stated that “the standard-setting part defines a New Nonroad Engine as the time when it is fully assembled for the first time."

Some marine engine manufacturers pointed out that that boat owners sometimes want to upgrade their engines, not because they are at the end of their life but because they want more power, additional features, or new technologies. They suggested that manufacturers should be able to supply noncompliant replacement engines to meet the demand for these engines.

Kubota commented that they would like EPA to advise Kubota on the proper wording for a replacement engine label that is to be used on a “replacement engine” that is going in place of a failed TPEM (Flex) engine. From the statement of the replacement engine label, Kubota cannot legally install this label onto a TPEM engine. Per the CFR and CCR, the statement would be as follows; "THIS ENGINE COMPLIES WITH CALIFORNIA OFF-ROAD AND U.S. EPA NONROAD EMISSION REQUIREMENTS FOR 2004 ENGINES UNDER13 CCR 2423(j) AND 40 CFR 89.1003(b)(7). SELLING OR INSTALLING THIS ENGINE FOR ANY PURPOSE OTHER THAN TO REPLACE AN OFF-ROAD ENGINE BUILT BEFORE JANUARY 1 2008 MAY BE AVIOLATION OF CALIFORNIA AND FEDERAL LAW SUBJECT TO CIVIL PENALTY." Because their TPEM engines would be produced after January 1, 2008, they have a conflict.

Kubota suggested wording be something like: "THIS ENGINE COMPLIES WITH CALIFORNIA OFF-ROAD AND U.S. EPA NONROAD EMISSION REQUIREMENTS FOR 2004 ENGINES UNDER13 CCR 2423(j) AND 40 CFR 89.1003(b)(7). SELLING OR-INSTALLING THIS ENGINE FOR ANY PURPOSE OTHER THAN TO REPLACE AN OFF-ROAD ENGINE BUILT BEFORE JANUARY 1 2008 OR A FLEXIBILITY PROGRAM ENGINE MAY BE AVIOLATION OF CALIFORNIA AND FEDERAL LAW SUBJECT TO CIVIL PENALTY."

Cummins asked that the following sentence be added to §1068.240(a): “In circumstances involving a TPEM engine or an engine certified to a later Tier level using AB&T credits, the engine is considered interchangeable with a previous Tier engine for the purpose of installation in a piece of equipment as long as the engine is identical in all material respects to the engine being replaced.”

Letters:

Commenter	Document #
Cummins	0719
Kubota	0744
ECO	0802
IMPCO	0812
EMA	0808
EMA	0809

Our Response:

While we do not necessarily agree with EMA’s assertion that previous version of the replacement engine exemption would be unworkable for partially complete engines, we do believe that the approach being finalized is more appropriate. Under the revised approach, which is intended to address EMA’s concerns, manufacturers will be allowed to produce replacement engines (including partially complete engines) with less tracking. See section VIII.C.5 of the preamble and §1068.240 of the regulations for detailed descriptions of this allowance. This allowance will be limited for each subcategory to no more than 0.5 percent of a manufacturer's annual sales for that subcategory. We agree with EMA that this allowance should apply for engines between 2.5 and 7 liters per cylinder.

We disagree with the comment suggesting a high sales/production limit (1.0 percent instead of 0.5 percent). The comment noted that this might be especially appropriate for small volume manufacturers. We note that manufacturers are always allowed to produce and sell an unlimited number of replacement engines if they track the engines and take possession of the old engines. This would be a workable alternative for a manufacturer producing only a handful of replacement engines each year.

It is important to note that these provisions are intended to allow for replacement of engines that fail prematurely where all of the following is true:

- The engine cannot reasonably be repaired or rebuilt.
- A different used engine (including rebuilt engines) cannot be used.
- No new certified engine can be used.

No matter which path the engine manufacturer uses under §1068.240, the provisions may not be used to circumvent emission standards that apply to new engines. Thus, boat owners are not allowed to use replacement engines to upgrade their engines because they want more power or new features.

With respect to IMPCO's comments, the new replacement engine allowance is intended to allow a small supply of replacement engines where they are legitimately needed, and not necessarily to allow the continuation of all current business practices without any changes. Under the regulations being adopted, IMPCO would be able to provide replacement engines through service facilities. However, this may require a new administrative process. We have added a new paragraph to 40 CFR 1048.601 to clarify how this would work for Large SI engines. With respect to the comment about current-tier engines, a replacement engine exemption is needed only in the case of partially complete engines that are not in their certified condition when introduced into commerce.

It appears that IMPCO is confusing the definitions of "new", "engine", "replacement engine", and "date of manufacture". An engine produced by a secondary engine manufacturer is first considered an "engine" when the crankshaft is installed in the block (which occurs before it reaches the secondary engine manufacturer). It is also considered "new" from that point until title is transferred to the ultimate purchaser. However, the engine is generally considered to have a date of manufacture based on when it arrives at the secondary engine manufacturer. Whether or not it is considered a "replacement engine" has no bearing on the meanings described above.

In response to EMA's request for clarification, we note that destroying an engine generally means to crush, melt, or otherwise modify the engine block so that it cannot be reused as an engine. Alternatively, you may destroy an engine by modifying it to destroy its original identity and make it a new engine.

We have revised the regulatory text to address Cummins' concern, but are not using their recommended text.

Finally, we have revised the labeling provisions to address concerns such as those raised by Kubota.

1.5.8 List of emission-related components

What Commenters Said:

MIC commented that it is proposed that "All components comprising the combustion chamber, including the piston, piston rings, block, head, and valves" be added to the existing list of "emissions-related components" listed in Appendix I to Part 1068. The inclusion of these basic engine components would be inconsistent with the definition of "emissions-related components" contained in section III of Appendix I, which is "any other part whose only purpose is to reduce emissions or whose failure will increase emissions without significantly degrading engine performance." Clearly, pistons, piston rings, the block, the head and the valves do not have emissions control as their only purpose. Because the "failure" of any of these parts will clearly degrade engine performance, they should not be added to the list of emissions-related components. Adding such components would also be inconsistent with the way on-road vehicles are treated under the Clean Air Act. The implications of this change are so great that there would need to be a careful evaluation of the cost before proceeding.

Arctic Cat commented on Appendix I to Part 1068 - Emission-Related Components (I)(5). This change greatly expands the definition of emissions related components to include the following: "All components comprising the combustion chamber, including the piston, piston rings, block, head, and valves." Arctic Cat recognizes this as a major departure from past EPA policy and is not consistent with how other categories are treated. It is also their understanding that this section is not consistent with the Clean Air Act. Arctic Cat does not feel a change of this magnitude it appropriate here given the absence of any discussion with industry on the nature of failures of the newly added components or their potential effect on emissions. In the recreational category failures of the newly added components have unique causes and effects which should be studied before proceeding with this policy change.

OPEI commented that the list of emission components is too general and can lead to broad misinterpretation as to what is covered. OPEI suggests EPA use the California ARB list.

EMA commented that EPA proposes to expand the emission related parts list (as defined in Appendix I to Part 1068) to include components comprising the combustion chamber, including the piston, piston rings, block, head, and valves. This expansion of the emission related parts list is not justified as those parts are critical to the basic function of the engine.

EMA also commented on Appendix I to Part 1068 – Emission-Related Components.

The emission related parts list as defined in Appendix I to Part 1068 is proposed to include components comprising the combustion chamber, including the piston, piston rings, block, head, and valves. This expansion of the emission related parts list is not justified as these parts are critical to the basic function of the engine.

Impco commented that we should add clarifying language to the list of components related to evaporative emissions to take into account the fact that the standards do not apply to engines fueled by natural gas or LPG.

Letters:

Commenter	Document #
MIC	0701
Arctic Cat	0709
OPEI	0675
EMA	0691
Impco	0812

Our Response:

We agree with the commenters that it is not necessary or appropriate to include the proposed changes to the list of emission-related components. We are not adopting the proposed changes.

We also agree with Impco's input regarding natural gas and LPG engines. However, we have addressed this concern by adding a note to the introduction to this appendix to clarify that the list of components does not make parts "emission-related components" if the equipment in which those components are installed is not subject to evaporative emission standards.

1.5.9 Export exemption

What Commenters Said:

Honda recommends that EPA apply the requirement for exemption labels ONLY when there is a reciprocal agreement between the United States and the other country to accept the EPA regulation and labeling as demonstrating full compliance with that other country's emission regulations. Honda also requests that EPA develop and provide a continuously updated list of these countries and sufficient lead-time to comply with these requirements. Finally, Honda recommends that the final rule provide another section under engines for export to allow a manufacturer in full control of engines or products destined for another part of the world to forgo the temporary exemption label on individual engines or product and boxes. Small engines and the equipment they power are not only valuable national industries but global industries with a positive contribution to U.S. international trade. The ability to build engines and products in the U.S., exempt from EPA regulation but complying with the regulations in another country, is an important option that exists today. Honda understands that the purpose of the exempt label is to prevent inadvertent introduction of these export engines or equipment using these engine into U.S. commerce. However, they believe the proposed label language has significantly greater content than is necessary to convey the message that the engines are for export and exempt from U.S. EPA regulations. Also, in many cases the engines/equipment being exported are labeled for compliance in another country or area, such as Europe. The combination of another country's compliance label and a label stating that the engine is "not for sale in the U.S." would be more likely to convey some meaning to a potential label reader and it will still be useful (and less likely to be misunderstood) when the engine is in another country. Furthermore, a temporary exemption label is not the only means of assuring that engines or products are exported and not introduced into U.S. commerce. If a manufacturer has full control of the engines, or equipment with these engines, from the point of final assembly until they have left the U.S., a temporary label would serve no purpose.

OPEI provided the following comments related to the export exemption:

- It is not clear why §1068.230 is required at all. At a minimum OPEI believes §1068.230(a) needs revision. The term "with emission standards identical to ours" creates conflict with European regulation which may have identical emission standards but are not identical because of the lack of an ABT program, exemptions etc. OPEI suggests EPA means to say "with emission regulations identical to ours."
- Regarding §1068.230(c), OPEI believes each engine does not need to be labeled or tagged if the following conditions apply: 1) the shipping container is marked and 2) A manufacturer has procedures to insure they are not sold in the US market. 3) If an engine contains an emission label from another country. Otherwise, this paragraph should not apply.

Caterpillar expressed a concern that they (as the certifying manufacturer) appeared to be responsible even if another company would take an engine intended for export and sell that illegally in the United States. Caterpillar suggested that we instead identify the act of selling an export engine in the United States as a violation.

Impco recommended keeping the requirement for a permanent label on export engines and suggested requiring that the label include the corporate name and trademark.

Letters:

Commenter	Document #
Honda	0705
OPEI	0675
Caterpillar	0813
Impco	0812

Our Response:

The Clean Air Act is quite clear in describing the terms for exempting engines for export. Specifically, the Act calls for limiting the exemption for cases in which the other country has emission standards that differ from those that apply in the United States. The Act also specifies that exempt engines must be labeled. As a result, we have a consistent set of requirements for the various categories of nonroad engines, including Small SI engines regulated under part 90. This seems to be working today, so we do not see that there is a need for major changes to allow for the free flow of commerce. Nevertheless, we are making three adjustments to the export exemption in §1068.230 to address the concerns raised by commenters.

First, we are establishing a streamlined path for certifying export-only engines where the destination country has the same emission standards. In particular, we would look for certification or other approval from the destination country as the basis for approving the export-only certification. Also, the requirement to pay certification fees would be waived for these engines. This special certification would be valid only for purposes of exporting the engines and would not be sufficient for selling the engines in the United States.

Second, we are clarifying what requirements apply for removable (or temporary) labels. In contrast to Honda's concern, we do not require permanent labels today for exported engines, nor did we propose such a requirement. For example, we specify that manufacturers can apply a removable label to exempted engines by labeling the container where multiple engines are packaged together. This is especially advantageous for Small SI engines where dozens of engines may be packaged together. In place of the removable label, manufacturers may alternatively apply a permanent label specified by the destination country if such requirements apply, in which case the bill of lading would need to also state that the engines must be sent to the named destination country to avoid a violation.

Third, we are revising the regulation to state that the exemption expires when the engine leaves the country. Anyone subsequently importing such an engine would therefore be guilty of a violation, rather than the original manufacturer. However, if at any point in the manufacturing or distribution process such an engine is placed into service in the United States, the certifying manufacturer would be held responsible for the violation. Manufacturers would do well to take steps to ensure that anyone responsible for installing or distributing such engines understands how important it is to avoid a situation where these engines are placed into service in the United States.

We agree that it is necessary to clarify what provisions apply for defining when another country has emission standards identical to ours. We would generally understand standards to be identical if they specify the same numerical level of the standard, the same test procedures (including fuel specifications), and the same approach for allowing the use of emission credits. For example, Canada currently specifies that Small SI engines used there must meet U.S. EPA standards. These engines would therefore not be eligible for an export exemption and must therefore be certified with EPA. However, Canada also specifies that a limited number of engines used in specialty applications may meet the Phase 1 standards rather than the current Phase 2 standards. These engines would be exempt from our emission standards and certification requirements because the applicable standards are clearly different than those that apply to Small SI engines produced for the United States for the given model year. If a manufacturer requests an exemption to export engines/equipment to a country that has standards similar but not identical to ours, we may ask the manufacturer to specify how such standards differ from ours. We may attempt in a future rulemaking to add language to the regulation to clarify when we would consider standards to be identical.

Note that engine manufacturers do not need an exemption or any special approval to ship engines that are certified and labeled for the U.S. market if some of those engines may be diverted for export by distributors or retailers.

Impco incorrectly pointed out that current regulations specify a permanent label for export engines. The regulations specifically state that the label need not be permanent. This is appropriate since there is no benefit of having the label once the engine is outside the United States. Moreover, manufacturers have pointed out that a permanent label would be problematic once the engine is sold and placed into service in another country. We agree that the label should identify the manufacturer's corporate name and trademark and have changed the regulation accordingly.

1.5.10 Manufacturer-owned exemption

What Commenters Said:

EMA commented that adding "possession" to the list of qualifying criteria for the manufacturer-owned exemption adds a significant constraint on manufacturer's ability to complete all the requirements associated with introducing new products into the marketplace.

Impco similarly objected to including the word "possession" to the list of qualifying criteria for the manufacturer-owned exemption, noting that another company should be able to execute a development program on their behalf without triggering the need for EPA approval under the testing exemption.

Letters:

Commenter	Document #
EMA	0808
Impco	0812

Our Response:

The existing manufacturer-owned engine exemption specifies that "an engine may be exempt without a request if it is a nonconforming engine under *your ownership and control and you operate* it to develop products, assess production methods, or promote your engines in the marketplace." We proposed to add the word "possession" to this language as a clarification because we discovered that some manufacturers mistakenly believed this exemption allowed them to provide these engines to customers for testing. Clearly, the existing language prohibits anyone other than the manufacturer from operating the engines. Thus, this revision is not changing the provisions that currently apply under the manufacturer-owned engine exemption; we are adding the word "possession" simply to eliminate any confusion.

It is a separate issue whether we *should* allow manufacturers to relinquish possession of these engines without obtaining a test exemption. However, we continue to believe that engines exempted as manufacturer-owned engine need to be strictly controlled since this exemption does not require prior EPA approval. Anyone wishing to arrange for someone else to operate engines may ask for EPA approval under the testing exemption.

1.5.11 Other issues

What Commenters Said:

GE commented that the proposed §1068.420 as it would apply to an engine family when evaluated as part of a Selective Enforcement Audit (SEA) establishes failure criteria that are less stringent for new locomotives than the criteria established in §1033.415 for in-use locomotives that have between 50% and 75% of useful life service. The criteria in §1068.420 and Appendix A indicates that a failure rate of 60 % or more is required to establish that an engine family is noncompliant whereas §1033.415 mandates a test procedure that when extended to the maximum allowable number of 10 test locomotives logically establishes that a failure rate of 40% or more could be considered a noncomplying engine family based on the failure rate and EPA's judgment and consideration of other test results such as average emissions levels, existence of any defects, and other unspecified test factors. GE believes that it is illogical and unrealistic to expect locomotives that have been in service for 50% to 75% of their useful life to have an emissions compliance rate greater than the EPA has established for new locomotives and recommends that the compliance criteria for in-use testing in §1033.415 be changed to be no more stringent than that set for new locomotives as established in proposed §1068.420 and Appendix A.

California ARB encourages EPA to revise the provision in 1068.250(j) that would allow the extending of compliance deadlines for small businesses for up to three years total. At most, California ARB believes that the relief should be granted for two years in cases of extreme hardship. A two-year period should be sufficient to provide any manufacturer, even a small business entity, adequate time to achieve compliance.

California ARB also commented that the provisions of part 1068 apply to nonroad diesel engines, large spark-ignition engines, recreational vehicles, small spark-ignition engines, and marine spark-ignition engines. Although a unified program may appear to be easier for manufacturers to follow, it may be difficult to implement due to the distribution of various engine types in different business sectors.

OPEI commented on the following items:

- §1068.110(e) suggests owners can do diagnosis and repair themselves and charge manufacturer. This needs to be reworded to clarify that owners should file their warranty claims through dealers or other authorized representatives.
- §1068.210 conflicts with language in §1060.215(b). The provisions in §1068.215(b) should apply for development and test engines. OPEI asks whether §1068.215(b) does not apply to a test exemption. When developing new products, an important component of the program is field testing in real world conditions. Often units are placed with various test crews that use them in their normal day-to-day business activities. The units are monitored by the manufacturer and at the end of the test period, collected, reviewed and usually scrapped. While the crew is generating revenues by the use of the equipment, the manufacturer is not. OPEI asks how they apply this exemption for

testing/developing new engines/equipment. OPEI also asks why §1068.315 does not include test exemptions.

- OPEI requests EPA include emails as an acceptable form of owner notification of recall in §1068.520(a). OPEI notes that §1068.520(a)(9) requires a self-addressed card. OPEI asks about using an Internet site or toll-free number instead.

EMA commented on the following proposed items.

- The proposed definition of engine-based test appears to relate exclusively to exhaust emissions that are reported in g/kW-hr. Instead of engine-based test, the defined term should be "Engine-based Exhaust Emission Test" in order to differentiate between testing an engine for exhaust emissions and testing associated with demonstration of compliance with evaporative requirements that are either already in place (such as those for LSI and Recreational Vehicle), or those being proposed (such as those for Small SI or marine SI engines).
- The proposed definition of an incomplete engine assembly does not make sense and must be removed or carefully revised in a subsequent rulemaking in light of the discussion above regarding the definition of an engine.
- The proposed definition of a secondary engine manufacturer also will need to be revised, as necessary, based on the ultimate resolution of the definition of an engine and/or incomplete engine. As such, it should be deferred to a subsequent rulemaking.
- The proposed language addressing the practice of engine sector changes needs to be modified to make it clear that an engine that changes sectors, for example from nonroad to stationary, retains the engine's original date of manufacture and is subject to that sectors applicable standards for that original date of manufacture.
- The NPRM requests comments on applying any or all of the 'special compliance provisions' proposed for Small SI engines in Part 1054 to all nonroad engines by incorporation into Part 1068. The NPRM provisions for Small SI engines include several topics including: warranty coverage, bonding requirements, model year naming for imported engines, reporting requirements, etc. that require significant discussion with the various affected industries covered by Part 1068 prior to implementing these changes. EMA is ready to work with the agency to develop the required outreach and appropriate changes to Part 1068 but is concerned that the addition of this burden will delay the Final Regulation. (See 72 FR at 28212.)
- EMA supports the optional early adoption of 40 CFR Part 1068 (rather than the similar compliance provisions in parts 89, 90, 91 and 94) but objects to making this early-adoption mandatory. Many of the Part 1068 changes require significant resources to implement, and manufacturers may desire to implement these changes at the same time as the emissions standards change. (See 72 FR at 28212.)

Arctic Cat commented that sometimes a wrecked snowmobile can be fixed by replacing the tunnel (upon which the emissions label is affixed). The snowmobile must be wrecked in just the right way to call for tunnel replacement, otherwise it is usually totalled. A handful of times a year Arctic Cat has customers order tunnels and they have been asked about the emissions label. Arctic Cat assumes a new emissions label should or must be affixed as part of the repair since the old label would be discarded with the damaged tunnel. They cannot find any rules governing this situation. Such rules or guidance documents would be helpful in defining our policies.

Impco suggested that we modify §1068.105 to clarify that equipment manufacturers are subject to penalties if they do not follow the regulations, including emission-related installation instructions, and to add explanatory language to make it clearer what equipment manufacturers must do.

Letters:

Commenter	Document #
GE	0679
California ARB	0682
OPEI	0675
EMA	0691
Arctic Cat	0731
Impco	0812

Our Response:

GE's comment on the proposed §1068.420 is no longer relevant because the recently finalized 40 CFR 1033.601 excludes locomotives from Selective Enforcement Audits.

We intend to evaluate hardship applications submitted under §1068.250(j) on a case-by-case basis. We generally agree that one or two years of hardship relief should be adequate for almost all cases. However, we believe it would not be appropriate to change the regulation to rule out even the possibility of considering longer hardship relief for exceptional circumstances.

Part 1068 indeed applies broadly. The scope of part 1068 now includes all nonroad engine categories, though some types of engines will not be subject to part 1068 until new standards apply sometime in the future. We believe there are strong advantages to including these general compliance provisions in a single place in the regulations. Keeping one set of regulations current is straightforward, since we will not need to update parallel regulatory provisions when we amend the regulations periodically. We see no particular challenge in implementing these general compliance provisions for multiple engine categories as a result of this approach to adopting the regulations in one location. There are occasions where we need to make distinctions for certain engine types, but this is routinely handled directly in part 1068 or with clarifying provisions in the standard-setting part. This is certainly no greater challenge than having the entire program written separately for each engine category.

We have revised §1068.110(e) to clarify that manufacturers may require that owners submit warranty claims only through authorized repair facilities, consistent with OPEI's suggestion.

The manufacturers' comments show that they have misinterpreted the provisions in §1068.210 and §1068.215. In particular, §1068.215 specifies that the manufacturer-owned exemption is limited to engines owned and controlled by the manufacturer such that they are not used in revenue-generating service. It is incorrect to assert that this does not require actual possession of the engines by the engine manufacturer, or that the engines may be used to generate revenue, as long as the revenue does not go to the engine manufacturer. We are therefore adopting the clarifying change to include "possession" as an explicit requirement to qualify for the manufacturer-owned exemption. We understand that manufacturers have a legitimate need to share experimental engines with their customers, including those that may be used in revenue-generating service. However, the test exemption in §1068.215 is the appropriate path for these engines. The test exemption is available only upon request, which gives us the opportunity to be involved and aware of such engines. Engine manufacturers that hold a certificate of conformity (for any engine model or application) must generally submit only a minimal set of information and can have an exemption approved to cover a two-year period. This involves a minimal burden for the manufacturer, but keeps us informed of the status of these engines. We believe it would not be appropriate to allow for this practice without requiring the engine manufacturer to identify the basic elements of their plans to introduce such engines into U.S. commerce. As for importation, the testing exemption is temporary, so it is described in §1068.325 rather than §1068.315. It may turn out that engines are scrapped before the exemption expires, but it is still the case that the exemption applies for a given time period rather than for the life of the engine.

We agree that the regulation should acknowledge that Internet, e-mail, and toll-free phone numbers are legitimate alternatives to communication by traditional mail service.

The term "engine-based test" is used only in limited cases and in each instance the meaning of the term clearly applies only for exhaust emission testing. This also aligns with the intuitive understanding that engines are generally tested for exhaust emissions and equipment (or fuel-system components) are tested for evaporative emissions. We therefore believe it is not necessary to change the proposed definition.

The regulations no longer use the term "incomplete engine assembly" so we have removed this definition from §1068.30.

We have revised the definition of "secondary engine manufacturer" to reflect the input received regarding partially complete engines. As such, we see no need to defer these regulatory provisions or definitions until a later rulemaking.

We agree that the regulation should include clarifying language to state that changing an engine from stationary to nonroad would not cause the engine to be subject to standards based on the date of the conversion. Nonroad standards would apply based on the original date of manufacture. We have revised §1068.31 accordingly.

We have chosen to include the restriction related to naming model years for imported products in part 1068, rather than including that only for Small SI engines. We placed the revised regulatory language in the rulemaking docket and interacted with the Engine Manufacturers Association and several individual manufacturers to confirm that these provisions could be applied more broadly than just for Small SI engines. EMA's suggestion to waive the restriction for engines or equipment originally produced in the United States would be difficult to implement. It would be difficult for Customs to differentiate incoming products based on whether or not they had an actual point of origin within the United States. Perhaps more importantly, such a policy would likely be impermissible under the rules governing international trade, since it would clearly provide preferential treatment for domestically produced items.

We are adopting the other special compliance provisions, such as warranty assurance and bonding, only for Small SI engines. We may propose to apply these provisions for other engine categories in a later rulemaking.

In the absence of any supporting comments related to accelerating the migration to the general compliance provisions in part 1068, we are not making any broad changes to require earlier compliance with the regulatory provisions in part 1068. We agree, however, that there may be good reasons for manufacturers to opt into the part 1068 provisions before they would otherwise apply. Since these provisions represent the long-term plans for all nonroad engines, we are including a provision allowing manufacturers to comply with specific provisions of part 1068 early.

We agree that the regulations should include specific provisions to address the various responsibilities related to replacing emission control information labels due to accidents or other need for repairs. The engine manufacturer should be responsible for providing duplicate labels in these cases and should take steps to ensure that the labels are applied properly. These duplicate labels should include all the information from the original label except for the date of manufacture, which would be impractical to include as described in Section 1.3.2.

We agree with Impco’s recommendation to modify §1068.105 and have changed the regulation accordingly.

1.6 Certification fees (40 CFR part 1027)

What Commenters Said:

EMD included a comment about the certification fees for locomotive remanufacture systems in its written submission to docket EPA-HQ-OAR-2003-0190.11 They reiterate it here, in its more proper venue. The certification fees rule, included in 40 CFR Part 85, allows a reduced certification fee if the fee exceeds one per cent of the “aggregate projected retail sales price of all vehicles or engines covered by that certificate.”12 That language is carried over to the proposed Part 1027.13 In the case of emissions remanufacture systems, EPA interprets this provision to mean the price of the locomotives to which the kits are applied. This interpretation means that an engine family consisting of remanufacture systems whose price fairly reflects their contents has no chance of qualifying for a reduced fee unless sales of the systems certified under that family are zero, because the fee is much less than one per cent of the value of even one locomotive.

EMD commented that this situation is unfair to system manufacturers. EMD believes that the intent of the rule is to give manufacturers relief if their economic benefit is not commensurate with the cost of certification. The economic benefit to the manufacturer of a remanufacture system is the revenue to be gained by the sale of the system, not the value of the locomotive to which it is to be applied. It appears that the rule was written with only engines and complete vehicles sold by a manufacturer in mind, omitting consideration of remanufacture systems, which are a collection of parts with only a small fraction of the value of the complete engine or vehicle. EMD requests that this rule section be rewritten to include one per cent of the aggregate retail sales price of remanufacture systems, not the price of the locomotives to which they are applied, as the parameter for comparison to the certification fee to qualify for a reduced fee.14 The modification should be applied both to the applicable section of the current rule, Part 85, and to the new Part 1027.

EMD continued that EPA proposes to adjust certification fees only if the adjustment would exceed $50 per engine family. EMD opposes this proposal. EMD's engine families are in the "Other" category, which includes locomotives and compression-ignition marine engines, as well as other smaller classes of engines. Since fees were initially assessed in 2005, the fee for this category has declined from $826 to $802. EMD believes that it will continue to decline as the number of certification applications in this category increases. Therefore, the effect of EPA's proposal would be to hold the fee at an artificially high level until the adjustment reached $50, increasing EPA's revenue from this program at the expense of manufacturers. EPA should continue to adjust fees annually as required by the rule currently in force.

Letters:

Commenter	Document #
EMD	0687

Our Response:

We agree with EMD's suggestion to reconsider the cost basis for reduced fees for remanufacturing kits. We already have provisions in place for fuel-conversion kits in which the regulation specifies that the basis for evaluating the one-percent threshold is the value of the kit rather than the value of the engine. This applies anytime the particular engine is already covered by a certificate of conformity based on the original fuel. We believe a remanufacturing kit is analogous to a fuel-conversion kit for purposes of certification fees. While the remanufacturing kits may in some cases be applied to uncertified engines, in all cases the remanufacturing kits (and not the engine that is being modified) define the scope of the certification. We are therefore modifying the regulation to allow for reduced fees where the assessed fee is more than one percent of the value of the remanufacturing kit or remanufacturing system. This applies equally to locomotives and marine diesel engines, which are now also subject to remanufacturing certification provisions.

We disagree with EMD's assessment and recommendation regarding annual fee adjustments. We believe it is rather short-sighted to make a long-term policy decision based on an extrapolation of the trend from the last two or three years. While there have been substantial additional numbers of applications for certification recently, there is reason to believe that the calculated fee will not universally trend downward. First, some new applications result from the introduction of new emission control programs, such as for Large SI engines and recreational vehicles, which are clearly one-time effects. Second, while there has been a large number new companies certifying products from overseas, we are concerned in some cases about the ability of these companies to fulfill their obligations for warranty, recall, and other in-use compliance provisions. We are taking steps in this rule to make clear that certification is more than a one-time requirement, which we believe will serve as a disincentive for some companies that may otherwise have thought that certification provided a simple and clear path for introducing products into the U.S. market. We believe this trend will stabilize at some point. Third, even if these trends persist, it will not be long before the calculated fee exceeds the $50 threshold and we will change the fees accordingly. Fourth, inflation is part of the equation for calculating fees. We would not expect the effect of increasing numbers of certificates to always be enough to offset inflationary effects. Over any reasonable time frame, we would still expect the proposed provision limiting annual fee changes to be revenue-neutral.

EMD did not address the underlying reason for the proposal to limit annual fee changes. Our proposal was focused on minimizing confusion and administrative errors. To the extent that fees do not change from year to year, there will be fewer mistakes when people make their payments. Under the current program, it is not uncommon for people to overpay or underpay by a nominal amount. It is time-consuming, awkward, and wasteful to spend the time required to collect an additional $8 because an applicant was not aware that the fee had increased. Looked at from the other side, the cost to the government of issuing an $8 refund is about $75. We believe the public benefit of avoiding administrative errors far exceeds the benefit to EMD from reducing certification fees by $24.

Finally, there is a place for being cost-conscious; however, we believe the amounts in question hardly warrant controversy. In the most extreme case, under the proposed rule we would have a fee that is $49 less than it could be with an automatic annual readjustment. If EMD would sell a single locomotive in the family, the certification fee would be about 0.003 percent of their revenue for that one locomotive. With actual sales in the hundreds of units and expectation that these cost differentials will be much closer to zero, even this estimate vastly overstates the relative burden represented by the fee that is higher than the calculated value.

We find that our original reasons for limiting annual fee adjustments are unchanged. We are therefore finalizing these provisions as proposed.

1.7 Preemption of state regulations (40 CFR part 1074)

We have addressed comments related to preemption of state regulations in "Response to the Petition of American Road and Transportation Builders Association to Amend Regulations Regarding the Preemption of State Standards Regulating Emissions from Nonroad Engines," July 25, 2008.

1.8 Technical amendments for Large SI engines (40 CFR part 1048)

1.8.1 Fuel tank permeation

What Commenters Said:

IMPCO commented that EPA proposed that nonmetal fuel tanks must use a qualifying design specified in 1060.240 § 1048.245 How do I demonstrate that my engine family complies with evaporative emission standards?

(e) (1) (i) … Nonmetal fuel tanks must also use one of the qualifying designs for controlling permeation emissions specified in 40 CFR 1060.240.

According to §1060.1, these new LSI permeation standards are effective Model Year 2007.IMPCO requests that this be changed to MY2010. Given that it is now August 2007, it is too late for MY2007 design to change and MY2008 designs are frozen. Additionally, because MY2009 is an emissions carryover year, engine manufacturers did not anticipate making any design changes until MY2010.

ECO commented that they think the real concern for Genie is when the new requirements will come into effect.

Letters:

Commenter	Document #
Impco	0692
ECO	0741

Our Response:

We agree that allowing some lead time for implementing the design requirements related to plastic fuel tanks is appropriate. Delaying the implementation date until the 2010 model year should make it possible for companies to work with fuel tank suppliers to coordinate plans for making a smooth transition toward making compliant products.

1.8.2 Diurnal emission testing

What Commenters Said:

IMPCO noted that the proposed regulations state that a gas cap must be tethered or self-closing and stay sealed up to a positive pressure of 24.5 kPa. IMPCO commented that the definition of 'sealed' is still somewhat nebulous. IMPCO suggested that, among other allowable designs, the following should also be considered 'sealed':

- A fuel cap design used by an automotive OEM that has been certified under the EPA or California ARB enhanced evaporative emissions standards, or
- A fuel cap that is listed under UL 558, 'Industrial Trucks, Internal combustion Engine-Powered'
- Calculated HC emissions from the gas cap are less than some percentage of the evap standard (possibly less than 20%) over the 24-hr diurnal test (include a standard value to use for the % of HC in air at a certain temp)

Protectoseal believes their fuel caps can comply with the proposed requirements to stay sealed. Protectoseal noted that they have defined the set point of our caps as the positive pressure at which the caps first exhibit bubble leakage. Depending on the cap size and style, this bubble tight set point is between 3.5 psig and 4.5 psig. The caps are further designed to provide venting relief as the positive tank pressure increases beyond this set point. The caps also provide vacuum relief (under negative pressure conditions) to allow make-up air to enter the fuel tank and allow smooth flow of fuel to the engine. (Protectoseal included literature sheets that provide representative data of the flow/leakage data of the caps under pressure and vacuum conditions.) Protectoseal noted that they have worked with Underwriters Laboratories to make sure that the caps meet all their functional and safety related requirements (as evidenced by the UL Listing for our new designs) while also minimizing emissions into the atmosphere when the cap assembly is subjected to positive pressure.

Letters:

Commenterd	Document #
Impco	0614
Protectoseal	0615

Our Response:

We understand that an unqualified requirement to maintain sealed fuel tanks can be problematic, if only to recognize that a tank with undetectable leaks may nevertheless experience an infinitesimal vapor loss through very small imperfections in gasket materials, especially as materials age in normal service. Protectoseal's experience demonstrates that the concern for leaks is not a question of feasibility with respect to detectable leaks as measured by normal diagnostic tests. As a result, we do believe it is not necessary to add the several options recommended by Impco for demonstrating that a fuel cap will adequately keep a fuel tank sealed. Rather, we are revising the regulation to require only that sealed tanks prevent measurable leaks. This should avoid a situation where someone feels at risk of being noncompliant based on extremely low leakage rates. Underwater "bubble tests" would be one appropriate method for establishing whether there is a measurable leak.

1.8.3 Certification related to evaporative emission standards

What Commenters Said:

ECO commented in order to address the inherent complications related to evaporative certification for LSI and SD/I engine families, ECO suggests that EPA consider establishing a component certification process for engine system / equipment components that have a bearing on the evaporative emissions of the engine / equipment. For instance, EPA should consider allowing equipment OEMs, or component manufacturers, to conduct their own independent certification of evaporative system components, including fuel tanks, lines, and caps. The format of this program could follow the format that the California ARB utilizes for Small SI engine evaporative components.

Letters:

Commenter	Document #
ECO	0712

Our Response:

We adopted evaporative emission requirements with the understanding that the large majority of gasoline-fueled engine models would be in installed in metal fuel tanks. In this scenario, designing systems to control permeation and diurnal emissions is very straightforward. Now that we are implementing these requirements, it has become clear that plastic fuel tanks are an important exception to accommodate. We have seen that it is impractical to expect engine manufacturers to be responsible for including plastic fuel tanks in their application for certification, since they generally are not involved in designing, shipping, or installing the fuel tanks. We believe it is appropriate to allow fuel tank manufacturers or equipment manufacturers to certify fuel tanks separately. We have revised part 1060 to allow for this certification path.

1.8.4 Definition of small-volume manufacturer

What Commenters Said:

ECO commented that 1048.801 defines a small volume manufacturer as an engine manufacturer with U.S.-directed production volumes, subject to Part 1048, totaling no more than 2,000 engines per year. It also defines a SVM as an engine manufacturer with fewer than 200 employees. Although ECO agrees with the redefinition of SVM, the new definition is missing the distinction that a company qualifies as a SVM by meeting either of the two criteria, not both. To provide a precise definition of SVM, the first sentence of the definition should read "Small-volume engine manufacturer means either one of the following."

California ARB's current large spark-ignition engine regulations do not have assigned DFs for small volume engine manufacturers. However, California ARB accepts EPA-approved "assigned DFs" for small volume engine manufacturers during the certification process. Due to variability of emission control technologies designed for large spark-ignition engines, California ARB will continue to work closely with EPA to review and approve "assigned DFs" on a case-by-case basis.

Letters:

Commenter	Document #
ECO	0712
California ARB	0682

Our Response:

ECO's interpretation of the proposed change to the definition of small-volume engine manufacturer is consistent with our intent. We have changed the wording of the definition to make this distinction clearer.

We look forward to working with California ARB further regarding assigned deterioration factors.

1.8.5 Additive deterioration factors

What Commenters Said:

IMPCO strongly supports allowing manufacturers to use either Multiplicative or Additive DFs. With more sophisticated engine technologies and ever-decreasing emissions, even the slightest increase in emissions can tremendously affect a multiplicative DF calculation. For example, with a low-hour value of 0.1 g/kW-hr and a 2,500-hr value of 0.3 g/kW-hr, the extrapolated 5,000-hr multiplicative DF is 5.000. However, an additive DF would be 0.400 g/kW-hr, which is far more representative of in-use deterioration.

ECO commented that newly added text to 40 CFR §1048.240(c)(2) states that engine manufacturers may utilize additive DFs for engine families with low-hour emission levels below 0.3 g/kW-hr. The mandatory use of multiplicative deterioration factors (DF) penalizes low emission engines, as the multiplicative deterioration process creates an exponential penalty for engines that produce extremely low 0-hour emissions. Because the allowance to use additive DFs encourages the development of the lowest emitting engine technologies, ECO and their stakeholder group fully support this change and encourage EPA to retain the additive DF allowance in the final rule.

In subsequent comments, ECO suggested changing the threshold for using an additive DF from 0.3 g/kW-hr (for all pollutants), to one based on measured low-hour test results less than 11 percent of the applicable standard. Alternatively, the threshold for CO could be increased to 0.48 g/kW-hr. These adjustments would take into account the higher numerical standard for CO.

ECO also suggested in the later comments that the regulation should state that a given engine might use an additive DF for one pollutant and a multiplicative DF for another pollutant.

California ARB supports using an additive DF if the emission levels are below 0.3 g/kW-hr. The use of an additive DF for engines with very low emission levels can accommodate the mathematical effects during the durability calculation.

Letters:

Commenter	Document #
Impco	0692
ECO	0712
California ARB	0682
ECO	0798

Our Response:

We agree that a slight increase in the accommodation for additive DFs for CO are appropriate. Since the mathematical and technological effects that lead to additive DFs are driven by the magnitude of the emission levels, not the compliance margin, we believe the best approach is to adopt a fixed threshold of 0.5 g/kW-hr for CO. This approach involves a consistent level of precision relative to the threshold for HC+NOx emissions.

The regulatory language in §1048.240 clearly provides for a separate decision regarding additive and multiplicative deterioration factors for HC+NOx and CO. This should make clear that the decision for an additive deterioration factor for one standard does not require an additive deterioration factor for the other standard.

1.8.6 Field-testing demonstration for constant-speed engines

What Commenters Said:

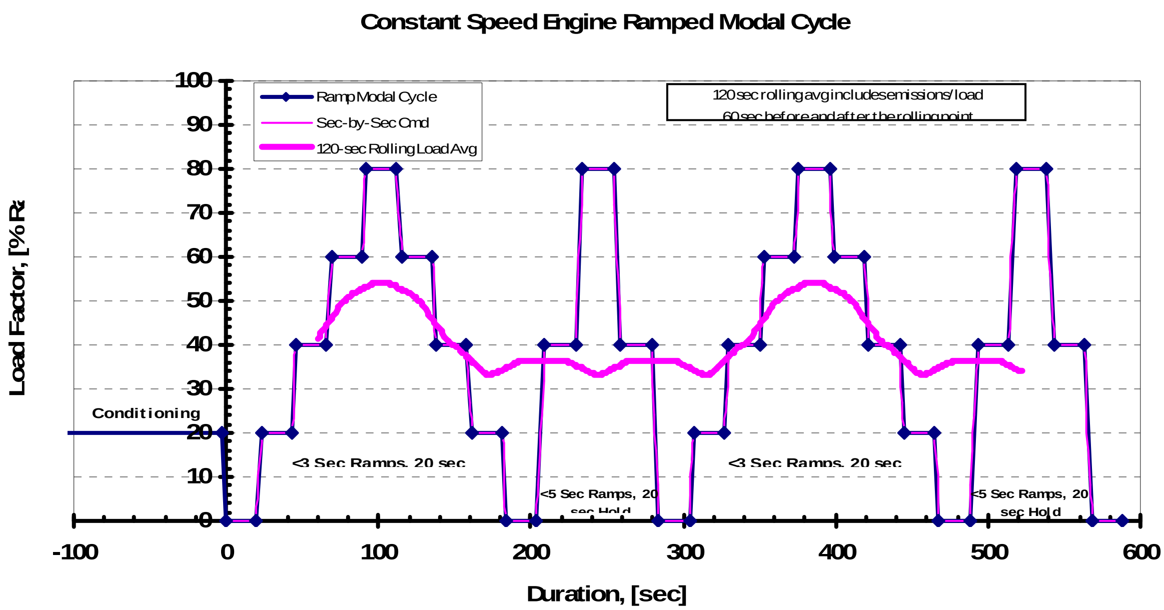
Intertek/Carnot recommended an approach to demonstrating for certification that constant-speed engines meet the field-testing standards. We requested comment on this because there is no longer a transient test requirement for constant-speed engines. The recommended testing involves ten minutes of engine operation consisting of steady operation for 20 seconds under several different load conditions. The test would be run like a ramped-modal cycle, except that the transitions between modes would last three seconds for increasing engine load in 20-percent increments and they would last five seconds for increasing load in 40-percent increments. The cycle does not include operation at full load, since spark-ignition engines generally don't operate for an extended time at full load. See the figure below for the detailed sequence of engine loads.

Letters:

Commenter	Document #
Intertek Carnot	0740

Our Response:

We believe the recommended cycle provides a good tool for evaluating whether constant-speed engines will adequately control in-use emissions under engine operation not included in the D2 cycle used for steady-state testing. This includes changes in engine load that would be common for typical in-use operation (increasing pump output, adding devices powered by a generator, etc.). These changes would not always occur with this frequency, but we believe this schedule of engine operation is realistic for many in-use scenarios. If manufacturers have information available to show that a different approach is more appropriate for their engines, we would consider approving alternative demonstrations. This might involve testing with the original constant-speed transient test, or some other schedule of engine operation to better reflect a relatively worst-case scenario of engine operation.



1.8.7 Other issues

We included several technical amendments for part 1048, which led to a variety of comments on relatively minor issues. This section describes these comments and our responses to them. We additionally address comments related to applying an engine's build date on the emission control information label in Section 1.3.

What Commenters Said:

IMPCO commented that EPA proposed to remove the requirement for constant-speed engines to meet the transient emissions standards in 1048.101(a). IMPCO strongly supports this, as the transient test cycle or constant-speed engines is not at all characteristic of constant-speed engine operation. The steady-state test cycles are far more representative and appropriate.

IMPCO also commented that EPA proposed to remove (b)(1) through (b)(11) of the AECD detailed description in the application for certification. IMPCO strongly supports this. It is important to document all AECDs to ensure that the proper regulatory guidelines are being followed. However, the additional time required to detail every aspect presently identified in the regulations creates an unnecessary burden on the manufacturer while providing little to no incremental benefit to EPA.

IMPCO also commented regarding § 1048.120(c), 1048.240(b), 1048.605(c)(2), 1048.610(d)(2), 1068.101(b)(2), 1068.120(a), 1068.501(a). Several areas throughout the proposed regulations refer to an increase in exhaust emissions of any pollutant. Pollutant should be defined only as those regulated under Parts 63, 1048, et al.

ECO commented on page 28148 of the Federal Register notice, section E(1) Deterioration Factors proposes an allowance for small volume engine families to utilize assigned deterioration factors. Additionally, on page 28213 of the proposal, EPA requests input on the use of assigned DFs for small volume engine families and requests comment on the appropriate production threshold for this allowance. ECO and their stakeholders feel this provision is necessary to allow flexibility for small volume SSI engine families. ECO also agrees with EPA, that the allowance to use assigned DFs for small volume engine families should also be incorporated into the large spark-ignition (LSI) engine rules contained in 40 CFR 1048. As it stands, there are numerous companies that do not meet the definition of small volume manufacturer (ref. 40 CFR 1048.801), but that produce one or more families of engines with production quantities of only a few hundred per year. This small production quantity does not allow MORs the ability to recoup costs associated with a typical durability operating cycle (2,500 hours), and often results in MORs discontinuing the certification and production of marginal product lines. ECO recommends that EPA consider the use of assigned deterioration factors for all LSI engine families with annual production quantities less than 300 units.

California ARB commented on the following sections:

- **22. Diurnal Temperature Cycle (40 CFR part 86.133-96):** 40 CFR part 86.133-96 requires a diurnal temperature cycle not common in California or much of the southwest. The temperature profile used by California ARB to represent California conditions is 65-105°F. California ARB recommends EPA modify the rule to require the more restrictive profile, which in addition to harmonizing, would ensure the expected emissions reductions are achieved even in the warmer parts of the country.
- **23. Diurnal Standard (40 CFR part 1048.105):** 40 CFR part 1048.105 requires tanks to meet the diurnal standard of 0.2 grams per gallon-day (g/gal-day). California ARB agrees that 0.2 g/gal-day is currently achievable. California ARB has test data that shows 0.1 g/gal-day may also be achievable. California ARB suggests that EPA propose a future date that includes the more stringent 0.1 g/gal-day standard.
- **24. Pressure Standard (40 CFR part 1048.245):** 40 CFR part 1048.245 requires a standing pressure test of 3.5 pounds per square inch absolute (PSIA). California ARB test data shows that on occasion tanks in California and presumably other warmer states can reach above 4.0 PSIA. California ARB recommends increasing the test standard to 5.0 PSIA.
- **25. Production Line Testing Exemption (40 CFR part 1048.301(a)(2)):** EPA's proposal exempts large spark-ignition engine families with a projected U.S.-directed production volume below 150 units from routine production line testing. However, production line testing is an important tool to ensure that manufacturers are meeting the requirements. Therefore, EPA should reconsider this exemption. California ARB plans to retain its current requirement for small volume manufacturers to test one percent of their California production.
- **26. Production Line Testing Procedures (40 CFR part 1048.305(a)):** EPA's proposal requires manufacturers to use either the steady-state or transient testing procedures to show that the production-line engines meet the exhaust emission standards. However, it is still not quite clear which test cycle should be used to generate DFs for production line testing. EPA should clarify that it will not allow manufacturers to use a DF generated by a steady-state test cycle to apply to a production line test using a transient test cycle.

- **27. Exhaust Emission Standards for Large Spark-Ignition Engines <1 liter (L) (40 CFR part 1054.105(a) Table 1): California ARB** recommends that EPA modify its proposed HC+NOx phase-in schedule for large spark-ignition engines ≤ 1 L to harmonize with the California small off-road engine exhaust emission standards for class II engines, 8 g/kW-hr at 2008 model year. This would provide for significant emission reductions from this category. Furthermore, a harmonized program would help reduce the problem of higher emission 49-state large spark-ignition engines traveling into the California fleet.

EMA commented that total engine displacement should be rounded to the nearest whole cubic centimeter. Accordingly, §1048.615(a)(1) should be revised to read as follows: "The engine must have a total displacement at or below 1000 cc after rounding to the nearest whole cc."

Caterpillar suggested that we make the following changes to the regulations related to natural gas engines:

- Modify 1048.620 to point towards 40CFR60 subsection JJJJ as the optional approach for transportable SI engines. This would allow either factory certification or site compliance testing, account for the varying fuels common to these applications, and still assuring emissions compliance.

- Remove the 250kw cutpoint and include all engines down to 25 hp, as that is where part 90 requirements are in effect for all small SI engines. This will then harmonize with the regulatory strategy in 40CFR60 subsection JJJJ.

- As 1048 already regulates gasoline and rich-burn LPG, this exemption need not apply to these fuels. However, all other fuel types should be included in the exemption. This harmonizes with the approach taken by 40CFR60 subsection JJJJ as well.

Letters:

Commenter	Document #
Impco	0692
ECO	0712
California ARB	0682
EMA	0691
Caterpillar	0814

Our Response:

We agree that the constant-speed transient cycle should be omitted from the regulation, as described in the proposed rule. We may pursue a more appropriate constant-speed transient duty cycle in a future rulemaking.

We agree that simplified AECD descriptions in the application for certification are appropriate, as described in the proposed rule. Manufacturers have the incentive to be thorough in describing their AECDs in the application for certification to avoid a situation where AECDS are detected outside of the certification process and questions are raised regarding whether the AECD qualifies as a defeat device.

We agree that all the references to pollutants in part 1068 should specifically refer to "and regulated pollutant." We have also changed the regulation at §1048.120 to refer to "any regulated pollutant." The reference in §1048.240 is clearly written in the context of pollutants that are subject to emission standards, so this change is unnecessary. The provisions in §1048.605 and §1048.610 are based on the expectation that the engine is installed in a nonroad piece of equipment without any changes that would affect fuel or air intake, combustion, or aftertreatment. It is therefore not clear that the regulation should specifically limit this provision to regulated pollutants. While we would not normally monitor compliance with respect to nonregulated pollutants, we would be interested in understanding why such an increase might occur.

As noted in the preamble, we are adopting provisions for assigned DFs for Marine SI and Small SI engines for small-volume engine manufacturers and for small-volume engine families. This is intended to address the concern that the costs of generating DFs can be quite large relative to revenues for niche products, even for very large companies. This same dynamic applies for Large SI engines, though to a larger degree. With a 5,000-hour useful life, the cost of generating DFs for an engine family are much greater than for Marine SI or Small SI engines. We agree with ECO's recommendation to adopt a provision allowing for assigned DFs for engine families with annual U.S.-directed production volumes at or below 300 units.

We adopted a temperature profile for diurnal emission testing that is consistent with the approach we take for light-duty vehicles. California's approach for light-duty vehicles is to specify the higher temperatures but specify a test fuel with lower volatility. EPA and California ARB have concluded that these two sets of test parameters yield very similar results. It is unlikely that changing the temperature and test fuel would lead to any design changes for improved control of emissions. We therefore believe it is appropriate to keep our existing regulation intact.

We adopted the diurnal emission standard expecting that most manufacturers would opt for the certification alternative to keep fuel tanks sealed up to 3.5 psi. This effectively achieves complete control for all but the large majority of summer days. For example, a fuel tank filled halfway with 9 RVP fuel would reach a pressure of 3.5 psi if ambient temperatures ranged from 72 to 96°F. We specify evaporative testing using these conditions to represent nearly a worst-case condition. The 3.5 psi specification is also consistent with the industry standard under UL558, so manufacturers have considerable experience in supplying products that comply with this pressure requirement. It is not clear that there would be a significant environmental benefit with higher-pressure fuel caps, or that such caps would be readily available for the full range of equipment that would need them. For manufacturers electing to test their systems to demonstrate compliance with the diurnal emission standard, it is not clear that a more stringent standard is appropriate. We are in the second year of implementing the diurnal emission standards and will be learning from this experience. Canister capacities and purge systems, the most likely alternative design solution, have been used for many years with light-duty vehicles, but there is little information available to show that a more stringent standard is appropriate. We would be interested in reviewing California ARB's information when it is available. However, it is not clear that the more stringent standard would lead to a meaningfully improved emission controls with in-use engines and equipment.

Production-line testing for Large SI engines relies on CumSum statistical calculations. To be able to make a pass/fail decision for an engine family, two test results are required to initiate calculations related to sample sizes and overall compliance. California ARB intends to limit testing to 1 percent of production, but for production volumes below 150, a one-percent rate in this case translates to a single engine. This was the primary basis for EPA's decision to waive production-line testing requirements for these small families. California ARB may continue to require testing for these engine families, but it is not clear single-engine testing can be reconciled with the need to use CumSum calculations to reach a conclusion.

Emission measurement during transient engine operation is very important for testing an engine's ability to control emissions over a wide range of in-use operation. We believe manufacturers should be able to choose whether to establish a single DF (for a pollutant) based on a comparison of emission measurements using transient operation only, or to generate separate DFs for transient and steady-state testing. We agree that it is not appropriate to allow manufacturers to use a DF from steady-state testing to characterize the aging effect for transient emission measurements. Selecting the type of engine operation for service accumulation is very different. We believe a variety of approaches can be used to properly age an engine. The most important parameters to consider are engine load (torque) and exhaust temperatures. It is not apparent that service accumulation based on transient engine operation is an important factor aside from considerations of average engine load and exhaust temperatures.

Manufacturers of engines at or below 1000 cc must meet the emission standards that apply for Class II Small SI engines to be exempt from the more stringent Large SI emission standards. We are including an update to reference the new standards for Small SI engines in part 1054. This provision requires manufacturers to meet the currently applicable phase of standards, so no further regulatory change will be necessary if or when we adopt an additional phase of standards for Class II engines.

We agree that §1048.615 should continue to apply for engines at or below 1000 cc (not 1000.0 cc), consistent with the original regulation.

The Clean Air Act requires that nonroad engines be certified before they are introduced into U.S. commerce. We are therefore unable to modify §1048.620 to make certification optional, as suggested by Caterpillar. This requirement does not apply to stationary engines. We may consider in a future rulemaking to specify the emission standards in part 60, subpart JJJJ, as being sufficient for certifying engines under §1048.620, but we would need to go through the notice-and-comment process for such an initiative. We established a threshold of 250 kW for these engines to avoid competitive effects where automotive-based natural gas engines would be potentially serving the same markets as the diesel-derived natural gas engines.

1.9 Technical amendments for recreational vehicles (40 CFR part 1051)

1.9.1 Maintenance

What Commenters Said:

MIC commented that 1051.125(d) defines the components specified in 40CFR Part 1068, Appendix I as being items of noncritical emission-related maintenance, but some of these components are also listed as critical emission-related components specified in § 1051.801, which causes mismatch. MIC recommends that the language be changed as follows: "...any other emission-related maintenance on the components other than critical emission-related components." While spark plugs are noncritical emission related components, the maintenance and inspection of them can be critical emission related maintenance. Manufacturers would like to have the ability to inspect and clean them during service accumulation on the emission-data vehicles. Federal Register Vol. 67, No. 217, pg. 68321 C.2 indicates that the EPA may allow changing spark plugs even though they are aware that spark plugs may affect emissions.

Letters:

Commenter	Document #
MIC	0701

Our Response:

We have revised §1051.125 to clarify the relationship between critical and noncritical emission-related maintenance.

1.9.2 Test procedures

What Commenters Said:

ISMA understands that raw gas sampling is permanently allowed for snowmobiles under the provisions of 40 CFR Part 1065. However, they note that calculation procedures similar to the fuel flow method in 40 CFR Part 90.419(c) and 40 CFR 91.419(c) for converting the raw gas sampling measurements into g/kW-hr emission levels are not explicitly provided in Part 1065. The fuel flow method is commonly used by the snowmobile manufacturers under the interim provision of 1051.145(e)(1), which allow use of the raw sampling procedures from parts 90 or 91 through the 2009 model year. 40 CFR 1065.601(c)(1) is intended to implicitly allow a functionally equivalent fuel-flow calculation method, based on reference to the ISO 8178 standards. The indirect allowance of 40 CFR 1065.601(c)(1) and the fact that the ISO 8178 standards are not freely available in the public domain have caused considerable uncertainty for the snowmobile manufacturers regarding the available raw-gas sampling options beyond model year 2009. The manufacturers note that the direct final rule for ATV's published in the Federal Register on April 26, 2007 extends the use of the raw gas sampling methods in 40 CFR part 90 or part 91 through the 2014 model year for ATV's. Since all of the ISMA members are ATV manufacturers familiar with these established methods, and since ATV manufacturers are allowed to continue using these methods for ATV's, ISMA proposes that EPA also extend the use of the raw sampling procedures in parts 90 or 91 through the 2014 model year for snowmobiles. This would provide the Agency with the time to codify more explicitly in Part 1065 the fuel flow method allowance that we understand is embodied in ISO 8178. It would also allow the ISMA member companies to use just one method for all of their raw gas sampling during the remaining time period that engine-based testing is permitted for ATV's.

Letters:

Commenter	Document #
ISMA	0671

Our Response:

We agree that an allowance for continued use of raw sampling procedures under part 90 or 91 is appropriate. As an interim measure, we are revising the regulation to allow this for demonstrating compliance with the Phase 1 and Phase 2 standards. We intend to revisit this question as part of the effort to revise the Phase 3 standards. We will at that time decide when manufacturers would appropriately be subject to testing requirements under part 1065.

1.9.3 Determining maximum engine power and displacement

What Commenters Said:

MIC commented that §1051.140 is a new section describing how to determine an engine's maximum power and displacement. This section references the 40 CFR part 1065 mapping procedures to determine maximum power. Those procedures require test equipment that can measure engine power during transient conditions as engine speed is changing. Compliance with the proposed new requirement involves significant equipment costs that do not contribute to greater emissions control. MIC therefore recommends that SAE J1349 be allowed as an alternative method for measuring maximum engine power. In calculating displacement, the proposed language requires "using enough significant figures allow determination of the displacement to the nearest 0.1 cc" while also stating that "An engine configuration's displacement is the intended swept volume of the engine rounded to the nearest 0.5 cubic centimeter". The standards applicable to ATVs are defined based whether the engine size is less than 225 cc or equal to or greater than 225 cc. It would therefore be more consistent to specify that the swept volume should be rounded to the nearest cc, rather than the nearest 0.1 cc. There is also an error in the example calculation incorporated in the proposed section. The correct displacement for the example values used is 176.7 cc, not 176.5.

Letters:

Commenter	Document #
MIC	0701

Our Response:

Manufacturers depend on the proper value of maximum engine power to calculate emission credits for averaging, banking, and trading. Manufacturers also need to determine maximum engine power to establish whether an offroad utility vehicle is above or below 30 kW. It is important to use an objective criterion to establish maximum engine power to ensure that manufacturers don't use available discretion (as under SAE J1349) to manipulate credit calculations or change the standards that apply for their products. It is also important to ensure that different programs use the same metric to establish whether standards apply to avoid overlap or gaps between programs. Maximum engine power is fundamentally a design value and does not necessarily require testing. The reference to the mapping procedures clarifies which design value is appropriate. We also specify that the nominal value for maximum engine power must fall within the range of values from production engines. This testing is not required, but it allows us to verify that the declared value is appropriate, especially for preventing manufacturers from gaining an advantage by declaring a value for maximum engine power that does not represent production engines.

We agree that the regulation specifies displacement values (such as 225 cc) only to the nearest cubic centimeter. We have therefore revised the regulation to require manufacturers to report displacement values to the nearest centimeter. However, to ensure that these reported values are accurate, we are keeping the requirement to use methods that allow for determining the displacement to the nearest 0.1 cc before rounding.

The comment pointing out an error in the calculation underscores the need for an example to illustrate the regulatory provision. The example calculation is correct, though the question is moot because of the change in precision described above.

1.9.4 Deterioration factors

What Commenters Said:

MIC commented that 1051.243(b)(6) says "You may use other testing methods to determine deterioration factors, consistent with good engineering judgment, as long as we approve those methods in advance." MIC's concern with this language is that resource constraints at EPA sometimes preclude detailed consideration of alternative testing methods even when they have been developed using "good engineering judgment." To address this practical concern, this subsection needs to be revised to read, "You may use other testing methods to determine deterioration factors, consistent with good engineering judgment, unless we provide an engineering analysis within 30 days demonstrating that the proposed method is not acceptable."

Letters:

Commenter	Document #
MIC	0701

Our Response:

We understand that there may be good reasons to modify plans for generating DFs for a given engine family. At the same time, evaluating such changes often involves more than a simple assessment. We are especially sensitive to the need for review of such requests based on many recent experiences with companies trying to exploit every possible angle to reduce the burden associated with certification, with no apparent regard to the environmental impact of these decisions. While an expedited response would clearly be of interest for manufacturers in many cases, but we believe it would be a good policy—or even in the manufacturer's best long-term interest—in setting a deadline for EPA's response. For example, if we would discover after 30 days that there is a problem with the manufacturers plan, there would need for further testing, either for extended service accumulation for a given emission-data vehicleor for restarting the durability testing altogether. If the EPA approval step is unacceptable, the only viable option is to remove the provision for alternative DF demonstrations.

1.9.5 Other issues

What Commenters Said:

ISMA commented recognizing the litigation that impacted on Phase 3 of the US EPA Rule for snowmobiles, they believe the published standard for Phase 3 in 1051.103 may be appropriately designated as "reserved" status.

ISMA commented that they do not support the proposed change in 1051.205(t). Production volumes are based on market analysis and behavior. These volumes can shift significantly from year to year from circumstances outside of a manufacturer's control. It is inappropriate for EPA to require a "justification" for a change in estimated production volumes from year to year.

ISMA does not support the recommended change in 1051.250 (a). Clearly this should not apply to corporate averaging engines which are already required to file two separate reports throughout the year. The snowmobile manufacturers provide actual production number on a quarterly basis in their PLT reports. In addition, manufacturers are required to provide final production volumes in their corporate average report. ISMA recommends EPA exempt manufacturers not using small-volume compliance provisions from this requirement.

ISMA does not support the recommended change to 1051.310 (b)(3). ISMA agrees with EPA it is appropriate for carry-over engine families to combine the last PLT test result from the previous model year with the first PLT test result from the current model year to determine the number of PLT tests required. However, EPA has proposed to add two sentences to 1051.310 (b)(3) which serve no purpose except to increase the test burden on a manufacturer, "Use the last test result from the previous model year only for this first calculation. For all subsequent calculations, use only results from the current model year. ISMA requests the last two sentences from this paragraph be deleted.

MIC and ISMA commented that it does not appear that the proposed deletion of the reference to "vehicle" testing from section 1051.315 is appropriate because some engine families are certified based on vehicle testing.

ISMA question why in 1051.350 the limit for keeping files has been switched from 1 year to 8 years. Also, additional definition is needed regarding the specific records being referenced.

MIC commented that proposed changes to 1051.350 increase the requirement for retaining paper records from 1 year to 8 years. If the retention period is going to be extended such a large amount then the requirement for "paper" records should be replaced with "paper or electronic" records.

MIC commented that the explanation for proposed changes to §1051.701 includes the statement that "We are also clarifying that a single family may not generate emission credits for one pollutant while using emission credits for another pollutant, which is common to all our emission control programs." However, the proposed requirement is not common (e.g., this issue was specifically addressed for snowmobiles during the recent rulemaking and EPA agreed that credits for one pollutant could be used by a family generating credits for another pollutant. This proposed change needs to be deleted.

ISMA commented that in 1051.801 EPA proposes to amend 40 C.F.R. § 1051.801 to redefine the term "designated compliance officer," in such a way as to treat snowmobiles differently than all other types of vehicles regulated under 40 C.F.R. part 1051 (i.e., off-highway motorcycles, ATVs, and certain utility vehicles and other types of motorcycles). Specifically, snowmobile issues would be handled by the Manager of the Heavy-Duty and Nonroad Engine Group in Washington, D.C., while all other part 1051-regulated vehicle issues would be handled by the Manager, Light-Duty Engine Group in Ann Arbor, Michigan. ISMA opposes this amendment and notes that EPA nowhere explains this proposal in the preamble to the proposed rule, and at the very least must do so in the preamble to the final rule. ISMA's members are entitled to expect EPA to minimize and not proliferate administrative compliance costs, and to that end should face a compliance approach that is designed to partner with manufacturers to pragmatically solve day-to-day issues arising from applying the part 1051 regulations. The Section 1051.801 proposal is not pragmatic. ISMA can see no rational basis on which EPA could cleave off compliance activities for snowmobiles from compliance activities for other types of vehicles regulated under part 1051. Thus, ISMA does not know how EPA could justify requiring companies that already face significant administrative compliance costs to duplicate their efforts across disparate parts of the Agency. This is particularly apparent to ISMA because each of ISMA's members manufacture both snowmobiles and ATVs. In general, it makes little sense to have different compliance officers interpreting and applying part 1051. Moreover, such a questionable organizational change fragments, and renders inefficient EPA's own operations, and it imposes added administrative compliance costs on manufacturers of products that arbitrarily must deal with one set of officials for one set of vehicles, and another for another set of vehicles, even though both types of vehicles are regulated by precisely the same part 1051 regulations. It makes sense to position the compliance officer for all vehicles regulated under part 1051 at the location that currently serves the greatest number of vehicles.

MIC commented that having a unique Designated Compliance Officer for snowmobiles would require companies that manufacture other types of vehicles to deal with two different offices on very similar, if not identical issues. For efficiency and consistency, it would be preferable to have snowmobile issues handled by the Ann Arbor office.

MIC commented regarding 1051.730. The intent of this subsection would be clarified if the term “sales weighted” is replaced with “U.S.-directed production weighted” instead of simply “production weighted.”

Robin America requested the following change to the Part 1051. If an engine manufacturer has general purpose engines approved (exhaust & evap) to either Parts 90 or 1054 they should be able to use these engines in ATV’s without having to meet the 1051 exhaust specifications. This will enable engine manufactures to sell general purpose standard spec engine to ATV manufactures without any additional testing on the part of either manufacturer. This change should be stated such that they can use previously approved engine from now until 2015 when the mandatory chassis testing is required.

Sierra Research commented that they heard that EPA was going to state 2010 model year at least for the labeling requirements. Also, they know in the Heavy-Duty world the use of older testing methodologies are allowed for some time while part 1065 requirements are made to lab facilities; will the same be allowed for the Recreational Vehicle category under 1051.140? Will older test data be useable as carry-over once the 1065 testing requirements become applicable?

Letters:

Commenter	Document #
ISMA	0671
MIC	0701
Arctic Cat	0709
Robin America	0743
Sierra Research	0742

Our Response:

There are two issues related to the Phase 3 standards for snowmobiles. First, the court decision stated that we do not have legal authority under the Clean Air Act to set NOx standards for snowmobiles and required that we remove the NOx component from the Phase 3 standards. We have addressed this in a separate rulemaking (72 FR 35946, June 25, 2008). Second, the court required that we provide further clarification and justification for the Phase 3 standards we set. We intend to address this second question in a separate rulemaking well before the Phase 3 standards are scheduled to take effect. We may or may not conclude that the Phase 3 standard needs to change. We therefore believe it is not necessary or appropriate to remove the Phase 3 standard from the regulation at this time.

The current requirement for manufacturers to estimated projected production volumes does not allow us to require realistic estimates. There are provisions in the regulations that depend on realistic projections, so we believe it is necessary for us to specify that these projections be based on proper assumptions. Records of previous production volumes and an assessment of current market conditions allow companies to plan for ongoing production rates. We would not expect to ask manufacturers to justify projected volumes for every family, but we might ask for more information if the sales projections depart substantially from those of earlier model years, especially where the projection would seem to provide an advantage for the company under the regulations. At the same time, we understand the recreational vehicles are particularly prone to periods of irregular demand, with the resulting variation in year-to-year sales figures for their products. We believe it is appropriate to keep the proposed requirement to use realistic values for projecting sales volumes for the upcoming model year.

We have changed the reporting requirements in §1051.250 to align with the reporting that manufacturers already do for production-line testing and credit reports. Specifically, we are requiring that manufacturers report their production volumes to the extent that those figures are not already included in these other reports. This is merely intended to complete the reporting requirement for cases where there are vehicles produced after PLT reports are complete (or if there is no production-line testing required for the family) or in cases where the manufacturer is not participating in the emission-credit program.

The changed language in §1051.310 (b)(3) will not increase manufacturers' test burden. The use of the test result from the previous model year is necessary in the first quarter of the new year is necessary to avoid an automatic second test in the first quarter. In the second quarter, the result from the first quarter can be combined with the new result from the second quarter to make the required CumSum calculations. There is therefore no longer any need to consider the result from the previous model year in the calculations for the current model year. The new language is intended merely to clarify the existing requirements, so we expect no additional test burden. We are adopting the new language as proposed.

We agree that the term "vehicle" should be preserved in §1051.315. This change was inadvertent.

We proposed to increase the time frame for keeping records to eight years to allow us to review the validity of the production-line testing throughout the time that these vehicles will be operating. This is consistent with the recordkeeping we require in our other emission control programs. We agree that keeping electronic records is sufficient, as long as the manufacturer can provide a printed copy of these records upon request. Since these records will generally stored electronically, we expect there will be little if any additional effort to keep the records for a longer time. The records that need to be kept are specified in considerable detail in §1051.345.

We agree that the current regulations allow manufacturers to generate emission credits for one pollutant while using emission credits for another pollutant with a given engine family. Disallowing this practice would effectively increase the stringency of the emission standards. We are therefore removing this provision from the final rule. We may revisit this issue for any more stringent standards that we set in future rulemakings.

The role of the Designated Compliance Officer in the regulations is simply intended to provide a point of contact for submitting information and requesting approvals. The regulation is not intended to dictate Agency decisions related to work flow or decision-making relative to internal organizational structures. We will be deciding how to manage and implement the certification process for recreational vehicles independent of the description and address noted in the definition of "Designated Compliance Officer" in §1051.801. Nevertheless, to reflect the fact that two of the three types of recreational vehicles are handled out of the Ann Arbor office, we are revising the regulation to specify that as the default location for the Designated Compliance Officer.

We agree that §1051.730 should use the defined term "U.S.-directed production volume".

We understand Robin America's interest in using certified Small SI engines for all-terrain vehicles (ATVs). We believe that conventional ATVs (straddle seat, handlebars, etc.) should be certified under part 1051 since those products are generally well established, high-volume products. It would not be appropriate to accommodate the interest in simplifying the certification process for these products. In contrast, the ATV definition also captures other rough-terrain vehicles that in many cases are low-volume niche products. We believe these vehicles can many times benefit appropriately from using certified Small SI engines based on the fact that these products are not as well established as high-volume recreational products. We are therefore adopting this allowance for these ATVs through the 2014 model year. Starting in 2015, manufacturers must certify their vehicles based on a chassis test, after which the ATV emission standards will be inherently different than the Small SI standard, as acknowledged by Robin America in its comment.

The regulations in part 1065 specifically state that manufacturers may delay complying with amended requirements for up to twelve months after those changes become effective. Many of the changes we are making to the regulations do not impose new requirements, but rather add flexibility or clarify existing requirements. The provision to delay complying with amended requirements allows for a more gradual transition when a regulatory change indeed imposes a new or different requirement. We are adding a similar provision in §1068.40 that would allow for delayed compliance with technical amendments in part 1068 or in the standard-setting part. Regarding the date of manufacture on engine labels, we are specifically stating that the new requirement does not apply until the 2010 model year.

1.10 Technical amendments for heavy-duty highway engines (40 CFR parts 85 and 86)

What Commenters Said:

EMA recommended that we delay the requirement to use the procedures in part 1065 until July 2010. To prevent this from impacting the stringency of the standards, they recommended specifically excluding certain provisions from the delay. They recommened that the regulations specify the following provisions from part 1065:

(1) Generate a map of your engine according to 40 CFR 1065.510(b)(5)(ii) and generate test cycles according to 40 CFR 1065.610. Validate your cycle according to 40 CFR 1065.514.

(2) Follow the provisions of 40 CFR 1065.342 to verify the performance of any sample dryers in your system. Correct your measurements according to 40 CFR 1065.659,

except use the value of Kw in §1342-90(i) as the value of (1-xH2Oexh) in Equation 1065.659-1.
(3) Verify your NO2-to-NO converter according to 40 CFR 1065.378.
(4) For diesel engine testing, correct NOx emissions for intake-air humidity according to 40 CFR 1065.670.
(5) You must comply with the provisions related to analyzer range and drift in 40 CFR 1065.550. If drift correction is required, correct your measurements according to 40 CFR 1065.672, but use the emission calculations specified in this subpart N rather than those specified in 40 CFR 1065.650.
(6) You must comply with 40 CFR 1065.125, 1065.127, and 1065.130, except for references to 40 CFR 1065.530(a)(1)(i), 1065.640, and 1065.655.
(7) Follow the provisions of 40 CFR 1065.370 to verify the performance of your CLD analyzer with respect to CO2 and H2O quench. You are not required to follow 40 CFR 1065.145(d)(2), 1065.248, or 1065.750, which are referenced in 40 CFR 1065.370.

Letters:

Commenter	Document #
EMA	0768

Our Response:

We agree with the manufacturers' comment and have revised the regulation accordingly.

1.11 Technical amendments for stationary engines (40 CFR part 60)

What Commenters Said:

EMA commented that Small SI engines generally are considered mobile due to their small size and relatively light weight. However, there are engines that meet the definition of Small SI yet, in fact, are utilized in stationary product applications. The EPA New Source Performance Standard (NSPS) for spark-ignition engines correctly requires such Small SI engines to meet the same emission requirements as their mobile counterparts. There are many cases where a Small SI engine that is certified, produced, and labeled as a mobile engine will actually be utilized in a stationary application. This industry practice must be maintained, and should not be adversely affected by the imposition of unnecessary labeling requirements that provide no environmental benefit. The final regulation should clarify that engines that are labeled as compliant with nonroad standards may be utilized in stationary sources without alteration, or additional labeling requirements.

EMA also stated that Small SI engine manufacturers do not have the ability to determine if an engine family may contain models that are subsequently utilized in a stationary application. As the proposed requirements for stationary and nonroad engines are intended to be identical, this differentiation is not significant. Accordingly, §90.107(d)(13) should be deleted.

Exergy commented that it is their understanding the proposed rule does not apply to engines for stationary power generation and/or shaft driven equipment using natural gas and/or propane. If EPA's proposed rule does apply, is there an exemption for stoichiometric and/or lean burn 19 kW continuous duty or long duty-cycle (greater than 1,000 hours per year) engines for stationary power generation and/or shaft driven equipment using natural gas and/or propane?

EMA suggested that we add clarifying language to §1068.31(c) to specify that the 12-month limit does not apply for fixed engines (i.e., neither portable nor transportable).

Cummins raised question about how to apply the definition of "nonroad engine" for engines that are installed in a fixed location. Aside from clarifying whether the requirement for such an engine to operate for at least 12 months to be considered stationary, they suggested adding regulatory language that would:

- Allow certain engines to be considered 'stationary' even if not at a given site for more that 12 months. Aside from the seasonal engine provision, this should include engines in natural gas production that are connected to the fixed fuel supply but that might need to move early due to lack of production. (Note that these engines are typically mounted in a frame/skid with compressing equipment, radiator, etc, and typically sit on a prepared dirt site.)
- NOT allow other engines connected to a fixed fuel supply for less than 12 months to be considered 'stationary'. An example recently discussed would be an SI genset mounted in a trailer on wheels. Such a unit ought to be able to connect to a fixed, natural gas fuel source for, say, three months without being considered stationary.

Because of the need to have engines in different applications, attached to a fixed fuel supply for a short period of time, to be treated differently, perhaps this would be better addressed by 'intent'. In the first example above, the intent would be for the unit to operate more than 12 months in the given location. In the second example, the intent would be to operate less than 12 months. The first example ought to be a stationary situation; the second example ought to be nonroad. Cummins did not recommend specific language to accomplish this, but suggested the following adjustment to paragraph (2)(iii) of the nonroad engine definition:

"An IC engine is not a nonroad engine if it meets any of the following criteria: ... (iii) The engine otherwise included in paragraph (1)(iii) of this definition remains, or will remain, <u>or is intended to remain</u> at a location for more than 12 consecutive months..." [emphasis added]

In response to draft language for §1068.31(c) to clarify the status of stationary engines that are neither portable nor transportable, Caterpillar suggested revised wording to make clear that the residence-time restrictions are the subject of the sentence, not the definition of a nonroad engine. The initial language was:

"Note that the definition of 'nonroad engine' in §1068.30 generally does not apply the residence-time restriction to engines that are neither portable nor transportable in actual use."

The suggested revision was:

"For engines that are neither portable nor transportable in actual use, residence time restrictions generally do not apply to the definition of a non-road engine in 1068.30."

Letters:

Commenter	Document #
EMA	0691
Impco	0692
Exergy	0627
Cummins	0785
Caterpillar	0822
EMA	0808

Our Response:

The regulation setting standards for stationary SI engines below 19 kW recognizes the points raised by EMA about the interchangeability of nonroad and stationary engines in this size range. The regulation specifies a single label for engines below 19 kW whether they will be used in nonroad applications, stationary applications, or both. It is important to note, however, that state and local governments are not preempted from setting standards for stationary engines, even if the engines are already certified to meet EPA's nonroad standards.

While the requirements for stationary and nonroad engines are identical, we may approve certain procedures separately for one or the other of these applications. We would expect only that the manufacturer would make a good-faith indication of how its engines might be used. There would be no violation if that expectation turns out not to be true in a way that could not have been predicted ahead of time.

It is not clear how Exergy could have thought that the proposed standards in part 1054 do not apply to stationary engines, since we stated clearly in the preamble and in the regulations that the standards apply equally to stationary and nonroad engines below 19 kW. There is no exemption available for any of the engine types or applications noted by Exergy.

The definition of "nonroad engine" applies residence-time requirements to portable and transportable engines to ensure that they are considered stationary only if they remain in one location for an established duration. Fixed engines (lacking the features that would make them portable or transportable) are inherently stationary, so the residence-time requirements do not apply to them. We would expect such engines to remain in one location for longer than the times we specify for portable engines, but it would not be a violation to move an engine before the specified period was complete. We agree that it is appropriate to add the clarifying language in §1068.31 to state that "for engines that are neither portable nor transportable in actual use, the residence-time restrictions in the definition of "nonroad engine" generally do not apply." Cummins' suggestion to rely on intent to determine whether an engine is stationary or not is unworkable. This would effectively make it impossible to hold someone responsible for moving an engine more frequently (or sooner) than is allowed under the regulation.

We have no objection to Caterpillar's suggested adjustment to the language in §1068.30(c) and have modified the regulation accordingly.

1.12 Technical amendments for nonroad diesel engines (40 CFR parts 89, 92, 94, 1033, 1039, and 1042)

What Commenters Said:

General Electric suggested that we modify the regulation in part 1033 to allow varying dilution ratios for different test modes.

Letters:

Commenter	Document #
General Electric	0786

Our Response:

We agree that it would be appropriate to address very small PM sample rates either by extending the sampling time or by adjusting dilution ratios, consistent with good engineering judgment. The original requirement in §1068.515 specified only the extended sampling time, but we believe the varying dilution ratios can be equally effective in making an accurate measurement.

1.13 Benefit calculations for ozone mortality

What Commenters Said:

Environmental Defense commented regarding EPA's Omission of Ozone Health Benefits is Arbitrary and Capricious and Contrary to Law. The harmful effects of ozone on human health and the environment are well documented. Indeed, the body of science linking ozone with premature mortality is one of the most significant developments in the last decade. The current proposed rule, if implemented, will greatly reduce emissions of ozone-precursors thereby achieving significant ozone-related health benefits. In light of the robust health benefits of this proposal Environmental Defense objects to EPA's failure to quantify any ozone benefits, including ozone-mortality. In its initial draft impact analysis, EPA estimated that by 2030 the proposed spark-ignition engine standards would result in the reduction of 631,000 tons of volatile organic hydrocarbon and 98,200 tons of oxides of nitrogen emissions. EPA projected that these reductions will likely correspond to significant reductions in the formation of ground-level ozone and would prevent between 60 and 360 ozone-related premature deaths, 800 hospitalizations, and almost 50,000 work days lost. EPA estimated the total benefits of this proposed rule range between $3.9 billion and $6.1 billion annually. However, EPA ultimately deleted all references to the above-listed quantified ozone benefits in response to pointed comments by the White House Office of Management and Budget. In the final Draft Regulatory Impact Analysis, EPA admits that it "typically quantifies ozone-related health impacts in its regulatory impact analyses when possible" and that "[I]n the analysis of past air quality regulations, ozone-related benefits have included morbidity endpoints and welfare effects such as damage to commercial crops." Nevertheless, EPA states that it is deviating from its "typical" practice due to a lack of conclusive scientific information as to how to quantify the benefits of ozone-related mortality. Furthermore, in order not to "provide an incomplete picture of all of the benefits associated with reductions in emissions of ozone precursors," EPA declined to quantify other health and welfare benefits.

Environmental Defense strongly disagrees with the assumption that there is insufficient information to include a valuation of mortality benefit. They also strongly object to EPA's failure to quantify any ozone benefits, such as crop damage, lost work days or hospitalizations. Environmental Defense believes that EPA's failure to consider the ozone mortality and nonmortality benefits associated with the proposed rules is arbitrary, capricious and contrary to law. See State Farm, 462 U.S. 29, 43 (finding agency failure to consider "an important aspect of the problem" arbitrary and capricious). Indeed, consideration of the full benefits of the emission reductions at stake only underscores the imperative of the Agency adhering to its statutory mandate under section 213 of the CAA to immediately take final action adopting emission standards that reflect the "greatest degree of emission reduction achievable" and "take effect at the earliest possible date."

Letters:

Commenter	Document #
Environmental Defense	0648

Our Response:

Though omitted in the proposal for this rulemaking, EPA agrees that there is sufficient evidence to include a valuation of the mortality benefit. We therefore quantify and monetize the ozone-related health impacts associated with the final rule, including both mortality and non-mortality impacts. This reflects EPA's most current understanding of the science surrounding ozone impacts on human health and welfare, consistent with the recent ozone criteria document, the analysis of the final ozone NAAQS, and the recently published report (April, 2008) by the National Research Council titled, "Estimating Mortality Risk Reduction and Economic Benefits from Controlling Ozone Air Pollution."

1.14 Air quality analysis

What Commenters Said:

NACAA commented that state and local clean air agencies across the country are facing the enormous challenge of developing strategies to achieve and maintain the health-based National Ambient Air Quality Standards (NAAQS) for ozone and fine particulate matter ($PM_{2.5}$). Air quality in approximately 120 areas of the nation currently violates the 8-hour ozone standard, the $PM_{2.5}$ standard or both, exposing more than 150 million people to unhealthful levels of air pollution. Clearly, considerable efforts by EPA, states and localities will be needed to reduce the widespread health and environmental impacts associated with emissions from contributing sources. In addition, EPA has already taken action to tighten the $PM_{2.5}$ NAAQS and recently proposed similar action on the ozone standard, which will increase the challenges facing states and localities. Further, many areas of the country are plagued by unacceptably high levels of toxic air pollution.

NACAA continued to comment that emissions from the nonroad spark-ignition engines covered by this proposal are substantial. Use of lawn and garden equipment totals more than 3 billion hours a year. A gasoline-powered push mower currently emits as much hourly pollution as 11 cars, a riding mower as much as 34 cars. Recreational watercraft can emit as much hourly as 348 cars. The resulting emissions contribute to unhealthful concentrations of $PM_{2.5}$, ozone, CO and toxic air pollutants, which translate into serious adverse health impacts, including premature death, heart disease, aggravated asthma and other respiratory conditions, as well as a host of environmental harms, such as visibility impairment and acid rain.

NACAA commented, as EPA appropriately acknowledges, absent action to reduce emissions, by 2020 these engines will contribute more than one quarter (1,352,000 tons) of mobile source volatile organic compound (VOC) emissions, nearly a third (16,374,000 tons) of mobile source CO, 16 percent (39,000 tons) of mobile source $PM_{2.5}$ and 4 percent (202,000 tons) of mobile source NOx. However, the agency's proposal, by 2030, will reduce annual emissions from affected sources by an estimated 630,000 tons of VOCs, 2.7 million tons of CO, 98,000 tons of NOx and 6,300 tons of direct $PM_{2.5}$. Among the quantifiable benefits that would, in turn, occur from these reductions is the prevention, annually, of an estimated 450 PM-related premature deaths, 500 hospitalizations and 52,000 lost work days. The total annual benefits in 2030 are estimated at $3.4 billion versus $240 million in annual costs.

NJ DEP commented that advancing the federal implementation dates would provide more timely air quality and health benefits to the residents of New Jersey. Ozone continues to be one of the most pervasive air quality problems in New Jersey. The 2002 New Jersey Emissions Inventory indicates that approximately 14% of the volatile organic compounds (VOCs) are from spark-ignited nonroad engines and equipment rated at 25 horsepower or less. On June 15, 2007, New Jersey submitted its proposed State Implementation Plan for the attainment of the 8-hour ozone National Ambient Air Quality Standard (NAAQS). It was an enormous challenge to develop strategies to reduce ozone in order to meet the 8-hour ozone NAAQS. When the USEPA revises the 8-hour ozone standard to be more protective of human health, New Jersey will face greater challenges to develop strategies to reduce ozone. Aligning the federal implementation dates more closely to the California ARB implementation dates will assist New Jersey in meeting these challenges.

South Coast AQMD commented on the South Coast Air Basin Air Quality Setting. As EPA is aware, the South Coast Air Basin (Basin) is designated nonattainment for the federal annual PM2.5 and 8-hour ozone ambient air quality standards and must attain these standards by 2015 and 2024, respectively. To achieve these deadlines, attainment must be demonstrated in the preceding years, e.g. 2014 for $PM_{2.5}$. Compared to the nation's other nonattainment areas, the South Coast Air Basin has the highest population-weighted ozone exposure of any area, representing 24 percent of the nation's 8-hour ozone exposure as well as its highest ozone design value. Almost 90 percent of the nation's total population-weighted exposure to fine particulates occurs in California. In addition, 52 percent of the nation's total exposure to fine particulates occurs in the South Coast Air Basin alone.

SCAQMD continued that these pollutant exposures result in severe public health impacts in the South Coast Air Basin. Numerous studies – conducted locally, nationally and internationally – confirm that ozone and particulate pollution have a direct impact on respiratory health, increasing asthma attacks, bronchitis, emphysema, chronic obstructive pulmonary disease, lung cancer and premature death. For example, studies in Southern California have found a significant risk of irreversible decline in lung function among children growing up in areas with relatively high particulate pollution. In addition, California ARB has estimated that particulate pollution in the Basin causes 5,400 premature deaths, 2,400 hospital admissions, 140,000 asthma and respiratory symptoms, 980,000 lost workdays, and 5 million restricted activity days for minors, every year.

SCAQMD commented that the region is moving ahead with efforts to attain the federal 8-hour ozone and annual $PM_{2.5}$ standards with the recent adoption of the 2007 Air Quality Management Plan (AQMP) for the South Coast Air Basin. The attainment challenges are significant given that stationary sources are now generally controlled to over 90 percent, and about 80 percent of the emissions in the Basin are caused by mobile sources. The attainment demonstrations provided in the 2007 AQMP show that the Basin cannot timely attain federal air quality standards without significant emission reductions from all sources, including nonroad spark-ignited engines. By 2023, pleasure craft will be the third highest VOC emission source category in the Basin (about 35 tpd) surpassing passenger cars, petroleum marketing, and architectural coating categories. To address this need, as part of the proposed state strategy for the California State Implementation Plan, California ARB is proposing new standards for outboard/personal watercraft to be implemented in 2013 that will reduce exhaust emissions of NOx and VOC by close to 70%. The 2007 AQMP also includes an additional control strategy that calls for accelerated turnover of outboard and personal watercraft engines to engines meeting the most stringent existing California standards as well as more stringent standards adopted in the 2014 timeframe for inboard and stern drive marine engines in order to achieve reductions. Achieving the maximum amount of emission reductions from nonroad spark-ignited engines is critical to the South Coast Air Basin for meeting the federal 8-hr ozone and annual $PM_{2.5}$ standards.

NY DEC commented that the ozone forming emissions of the engines targeted by this proposal are significant, and occur primarily in the summer ozone season. As EPA notes in Section XII-A of the Preamble, recreational marine and small land spark-ignition engines account for over a quarter of the national mobile source VOC inventory. The contribution of these emissions to ground level ozone formation is even greater because most of the use of these engines occurs during the summer ozone season, when most water-borne recreation, lawn and landscape maintenance, and outdoor construction takes place. Marine recreation, and the associated emissions are also concentrated geographically in areas with suitable waterways. Thus the fraction of the national inventory comprised of emissions from these engines likely understates their impact on ozone levels and National Ambient Air Quality Standard violations. There is clearly a need for the standards proposed by EPA.

Pennsylvania DEP commented that small land-based, spark-ignition engines and equipment and marine spark-ignition engines and vessels contribute significantly to the precursors of ground level ozone. At the existing emissions rates, these engines and equipment are expected to contribute as much as 10 to 15 percent of all the volatile organic emissions in 2009 in the 37 counties in Pennsylvania that are currently designated by EPA as eight-hour ozone nonattainment areas. As Pennsylvania and other states face the challenges in attaining and maintaining the existing and anticipated more protective ozone National Ambient Air Quality Standards and the fine particulate standards, EPA must move forward expeditiously with its full complement of controls on new mobile source engines. The projected emission reductions and health benefits anticipated by 2030 under this proposal are significant (631,000 tons of volatile organic hydrocarbon emissions, 98,200 tons of Nitrogen Oxides emissions, and 6,300 tons of direct particulate matter PM2.5 emissions, and 2.69 million tens of carbon monoxide emissions) and should, therefore, be achieved expeditiously.

Houston-Galveston Area Council commented that the Houston-Galveston-Brazoria (HGB) region is currently classified as a non-attainment area for the 8-hour ozone National Ambient Air Quality Standard (NAAQS). It should be noted that in a letter dated June 15, 2007, Texas Governor Rick Perry requested that the HGB region be reclassified as severe nonattainment for the 8-hour ozone NAAQS. Additionally, this region is very close to exceeding the $PM_{2.5}$ standard and has elevated levels of air toxics in localized areas. These air quality issues result in negative economic impacts, ecosystem damage, negative health effects, and a reduction in the quality of life in the HGB area. The unique industrial characteristics of the region combined with being one of the largest urbanized population centers in the nation present a particularly difficult challenge in terms of improving air quality. Though efforts to improve air quality have yielded some progress over the past decade, it is clear that much more needs to be done. The active support and participation of the federal government has been vital to air quality improvement efforts; however more than half of the ozone-forming pollution in this region is generated by mobile sources. Regulation of the emissions from mobile sources is outside the authority of individual states such as Texas.

Environmental Defense commented that it is well documented that, despite their size, spark-ignition ("SI") marine and small engines contribute significantly to the formation of ozone and other harmful air pollutants. EPA estimates that absent the implementation of these proposed rules, the emissions from spark-ignition marine and small engines will account for 27% of volatile organic hydrocarbon compounds (1,352,000 tons), 31% of carbon monoxide (16,374,000 tons), 4% of oxides of nitrogen (202,000 tons) and 16% of particulate matter (39,000 tons) from the mobile source sector by 2020.

Environmental Defense continued to comment that spark-ignition marine and small engines contribute to unhealthy air pollution concentrations of ozone, carbon monoxide (CO) and PM in numerous areas nationwide. The air pollutants emitted by these engines are associated with a host of adverse public health effects including acute respiratory problems, asthma, aggravation of cardiovascular conditions and decreased lung function. Acute exposure to CO can cause death and non-fatal poisoning. Gaseous vapors that escape from the fuel lines and tanks during gas refueling and accidental spills cause and contribute to carcinogenic and non-carcinogenic health problems. Exposure to ozone and particulate matter can cause premature death. The immediate final promulgation and implementation of EPA's proposal will help to ensure cleaner air and improved health for millions of Americans.

Environmental Defense commented on the following four pollutants:

A. Ozone

The SI small and marine engines subject to this proposal consist primarily of lawn and garden equipment and recreational boats utilized mostly during the hot summer months. As a result, the emissions from these engines play a particularly significant role in the formation of ground-level ozone. Ozone is formed by the combination of HC and NOx in the presence of heat and light. According to EPA, spark-ignition marine and small engines not only produce about one fourth the amount of smog forming HC as all of the cars on the road today but their emissions are concentrated during conditions especially conducive to ozone formation. California officials report that, on a gallon for gallon basis, these engines discharge 93 times more smog forming emissions than model year 2006 cars.

Approximately 157 million people are exposed to levels of ozone or “smog” that exceed the current national health-based standard. Ozone causes acute respiratory problems, asthma, reduced lung function and increased hospital admissions. Children and the elderly are most at risk. Recently, a federal advisory panel recommended EPA tighten the existing 8-hour ozone health standard due to mounting evidence that it fails to protect adequately human health. Scientific studies from the United States and Europe link short term increases in ozone levels to increased rates of death from respiratory and cardiovascular disease. Day-to-day increases in ozone concentrations during the summer have been linked to an increase in premature death. Final promulgation and implementation of EPA’s proposal would aid significantly in preventing ozone-related illnesses, work absences, and deaths.

Recent scientific information also demonstrates the harmful effects of ozone on plants and ecosystems. According to the EPA, ozone impairs crops, native vegetation, and ecosystems “more than any other air pollutant.” Indeed, in examining forest productivity and ecosystem diversity, ozone may be the pollutant with the “greatest potential for regional-scale forest impacts.” Exposure to ozone weakens plants, making them more susceptible to disease, insects and climatic changes. Changes in the biodiversity of plants and trees can affect entire ecosystems given the central role vegetation and forests play in providing food and habitat for many species of fish, birds and mammals.

B. Particulate matter

Spark-ignition marine and small engines are also significant producers of particulate matter. PM is a mixture of soot, smoke, and tiny particles due to direct PM as well as PM formed in the atmosphere from precursors such as sulfur dioxide, nitrogen oxides, ammonia and other pollutants. Scientific studies have shown a statistically significant relationship between short term exposure to PM from mobile source emissions and mortality. Results from a recent study on the contribution from mobile source emissions of PM in 14 U.S. cities indicates that mobile sources, such as the small and marine nonroad engines affected by this proposal, have a greater effect on the toxicity of ambient air than other sources.

Approximately 88 million people across the country are exposed to unhealthy levels of PM. Another 27 million are likely to live in areas with unhealthy levels of PM if steps are not taken to reduce PM emissions. Exposure to particulate matter can cause acute respiratory symptoms, decreased lung function and increased hospital and emergency room visits. Exposure to PM has also been linked to death from cardiopulmonary disease, premature death, lung cancer and infant mortality. People with heart or lung disease, the elderly, and children are most at risk. The proposed standards, if implemented, would prevent 460 premature deaths, 52,000 days of missed work, 500 hospital admissions, and 310,000 restricted-activity days. They would also greatly assist states and local governments in attaining or maintaining air pollution concentrations below the health-based NAAQS.

Particulate matter also causes a host of adverse environmental effects. PM impairs visibility, both by contributing to local and regional haze. The brown clouds that hang over many urban areas and haze surrounding our national parks and wilderness areas are caused by particulate matter. Reducing the PM emitted from small and marine engines will improve human welfare by helping to reduce these forms of visibility impairment. The SO2 and NOx that can transform in the atmosphere to PM also causes atmospheric deposition and acid rain. Acid rain is primarily responsible for elevated levels of acid in the many fresh-water bodies that dot the U.S. upper- Midwest and Northeast. High acidity in lakes and streams alters the chemical composition of the waters, leading to changes in vegetation, species loss and contamination. Atmospheric deposition occurs when SO2 and NOx deposit into streams, lakes and forest beds. The deposition alters water quality and vegetation and can lead to toxic algae and plankton blooms which can threaten human health and welfare. Immediate implementation of these standards will go a long way in improving human health and welfare and protecting our streams, lakes, forests and their inhabitants.

C. Carbon monoxide

In 1994 EPA determined that the lawn and garden equipment subject to these proposed rules contribute significantly to unhealthy CO concentrations. EPA currently is proposing to make a similar determination with respect to CO emissions from SI marine boats. EPA estimates that approximately 15 million people live in areas with unhealthy levels of CO.

Like exposure to ozone and particulate matter, exposure to CO causes a number of serious health effects. CO reduces the delivery of oxygen to the body’s organs and is associated with impairment of visual perception, work capacity, manual dexterity, learning ability and performance of complex tasks. The health threat posed by CO is particularly acute for individuals suffering from cardiovascular disease. CO emissions also contribute to the formation of ground-level ozone. Exposure to acute levels of CO can result in fatal and non-fatal CO poisoning. Between 1984 and 2004 there were 113 reported deaths and 458 non-fatal poisonings caused by exposure to CO. Recreational boaters, inhabitants of house boats, and people swimming around docks are primarily at risk of accidental fatal and non-fatal CO poisoning. A number of federal agencies have issued health advisories to warn recreational boaters of the serious threats posed by exposure to CO. Immediate finalization of the proposed rules will reduce the number of

CO-related deaths and illnesses and help to ensure that people living, working, or recreating around SI marine boats and vessels can do so safely.

D. Toxic Air Pollutants

Gaseous air toxics, such as benzene, 1, 3 butadiene, formaldehyde, acetaldehyde and napthalene, comprise another major category of air pollutants emitted by these small engines. Exposure to the vaporous air toxics emitted from these engines causes carcinogenic and non-carcinogenic health effects. According to EPA's 1999 National-Scale Air Toxics Assessment, all of the air toxics emitted by these small engines, with the sole exception of acetaldehyde, comprise a significant portion of the total inhalation cancer risk from mobile sources. Air toxics also cause a number of other serious noncancer health problems involving the neurological, cardiovascular, liver, kidney, respiratory, immune and reproductive systems.

One of the air toxics emitted by these small engines, benzene, poses a particularly serious threat to human health. Benzene is one of the most significant contributors to cancer risk of all air toxics in the ambient air. Assuming continuous exposure to 1999 levels of all outdoor air toxics, the nationwide lifetime population cancer risk was 42 per million. According to EPA, benzene was responsible for 24% of this cancer risk, and was responsible for 42% of the total inhalation cancer risk from mobile source air toxics. EPA's proposal to require more stringent measures to control the toxic evaporative emissions from these engines is essential in reducing the cancer, and non-carcinogenic, inhalation risk from mobile sources.

Letters:

Commenter	Document #
South Coast AQMD	0704
NJ DEP	0710
NY DEC	0659
Houston-Galveston Area Council	0633
Environmental Defense	0648
NACAA	0651
Pennsylvania DEP	0676

Our Response:

We agree that emissions from small SI and marine SI engines are significant and often occur during the ozone season. The final rule estimates that these engines emit over 2 million tons of volatile organic compounds (VOCs) and almost 170,000 tons of NOx annually, and contribute to adverse health and welfare effects associated with ozone, PM, NOx, VOCs including toxic compounds, and carbon monoxide (CO). Without this rule, emissions from Small SI and Marine SI engines, equipment and vessels would continue to grow and would become a larger percentage of total mobile source emissions. By 2030 this final rule will reduce VOCs by 604,000 tons and NOx by 132,200 tons annually.

This rule will help states to reduce air toxics and meet the health and welfare based National Ambient Air Quality Standards (NAAQS) for ozone, PM and CO. As of March 12, 2008 there are approximately 140 million people living in 72 areas designated as nonattainment with the 1997 8-hour ozone NAAQS. In addition, approximately 88 million people live in areas that are designated as nonattainment for the 1997 $PM_{2.5}$ NAAQS and 850,000 people live in areas that are designated as nonattainment for the CO NAAQS. Both the ozone and $PM_{2.5}$ NAAQS have been amended in the last few years and are now more stringent. States with nonattainment areas are required to take action to bring those areas into compliance in the future. We expect many of the ozone and $PM_{2.5}$ nonattainment areas will need to adopt additional emissions reduction programs to attain and maintain the NAAQS. The emission standards being finalized in this action will become effective between 2009 and 2013 and will be useful to states in both attaining and maintaining the NAAQS. For discussion on the timing of the standards, see Sections 3.2.2, 3.3.2 and 3.4.2

According to air quality modeling performed in conjunction with this rule, the emissions reductions will result in nationwide improvements in ambient ozone concentrations as well as decreases in $PM_{2.5}$ concentrations. By 2030 these reductions will annually prevent 230 PM-related premature deaths (based on the ACS cohort study), between 77 and 350 ozone-related premature deaths (assuming a causal relationship between ozone and mortality), 1,700 hospital admissions and emergency room visits, 23,000 work days lost, and approximately 590,000 minor restricted-activity days.

1.15 Other issues

What Commenters Said:

OPEI noted that substantial evaporative benefits and exhaust emissions benefits will be achieved through the investment of OPEI members to produce Phase 3 compliant products. However, OPEI shares the concerns of state organizations and environmental groups, like the American Lung Associations and Clean Air Watch, that these air quality benefits and related investments could be undermined if EPA approves any new waiver for fuels containing greater that 10% ethanol. OPEI commented that EPA must fulfill its statutory obligations under section 211(f)(4) of the Clean Air Act to carefully review and respond to any waiver for mid-level ethanol fuel blends. The 250 million Americans that own and operate over 400 million lawnmowers, chainsaws, boats, motorcycles, snowmobiles and automobiles are relying on EPA to make sure that neither their products, nor the environment, are damaged through the approval of fuels containing greater that 10% ethanol. OPEI also submitted a technical report to EPA to highlight the expected adverse impacts of mid-level ethanol blends (see docket item EPA-HQ-OAR-2004-0008-0746).

Letters:

Commenter	Document #
OPEI	0675

Our Response:

Although there has been interest expressed by some areas for a mid-level ethanol fuel blend (i.e., containing more than the current 10 percent ethanol blend), EPA has not received an application for a waiver request at this time. Should EPA receive such a request, EPA would fulfill its statutory requirements under the Clean Air Act in responding to the waiver request. It can be noted that the recent Energy Independence and Security Act of 2007, revised section 211(f)(4) of the Clean Air Act. While the basic criteria for analyzing a waiver request stayed the same, the revised language states that EPA must also analyze the impact on nonroad engines and vehicles. In addition, EPA "must take final action to grant or deny an application submitted under this paragraph, after public notice and comment, within 270 days of the receipt of such an application." Prior to the recent change, section 211(f)(4) said the waiver would be treated as being granted if EPA did not act within 180 days.

2 Exhaust Emission Standards and Related Requirements for Small SI Engines

What We Proposed:

The comments in this section generally correspond to Sections V and VII of the preamble to the proposed rule, where we describe the proposed emission standards and certification procedures associated with exhaust emissions from Small SI engines. The applicable regulatory provisions for these proposed requirements are in 40 CFR parts 90 and 1054. The Regulatory Impact Analysis describes the feasibility of these standards, special provisions that apply to small businesses, and alternative standards under consideration in Chapters 4, 10, and 11, respectively.

See Chapter 1 of this document for a discussion of issues that apply more broadly than only for Small SI engines. See Chapter 4 of this document for a discussion of issues related to evaporative emissions.

2.1 Scope and applicability

2.1.1 Definition of handheld

What Commenters Said:

OPEI commented that EPA appears to have two definitions of handheld indicated in 1054.101(c) and 1054.801. In order to prevent the unintended reclassification of these products in 1054.801, OPEI commented that EPA should keep the newly proposed weight limits intact but make a revision to the definition of a handheld engine in 1054.801 by adding paragraph (6) Is used in a portable hand-supported jackhammer/rammer, compactor (vibratory or other) or other similar product. As an alternative, EPA could add a statement to the definition in 1054.801 indicating all engines/product less than 80cc are automatically handheld regardless of weight etc. OPEI also commented that paragraph (4) of the definition should be revised to eliminate “one-person” since many augers using handheld engines can be operated by two-persons.

EMA commented that the NPRM properly categorizes equipment utilizing engines less than or equal to 80cc total displacement as “handheld.” The NPRM also correctly categorizes equipment utilizing engines with larger than 80cc total displacement, but also meeting additional requirements, as eligible for categorization as handheld. Such engines should be allowed to continue to meet handheld exhaust standards, and should be considered handheld engines/equipment for purposes of the new evaporative standard requirements. In addition, equipment that EPA has historically approved as meeting the definition of “handheld,” such as compactors/rammers, should be allowed to continue to be categorized as handheld and should be specifically included in the regulation in order to ensure that all industry and agency personnel are aware of the appropriate determining factors.

EMA submitted comments on EPA’s proposal to modify the handheld definition by increasing each of the specified weight limits by 1 kilogram (72 FR at 28141). EMA agrees that an adjustment is required. However, they commented that the proposed adjustment is insufficient for the conversion of prior emission control engines to either catalyzed two-cycle engines or four-cycle engines, as required to achieve exhaust emission standards. EMA recommended that the handheld definition be adjusted by increasing each of the specified weight limits by 2 kilograms.

The California Air Resources Board (CARB) believes categorizing handheld equipment is best done by engine size such as the 80cc limit set by California. This gives the engine manufacturers an emissions design target at the beginning of the process. To the extent EPA believes it necessary to maintain the handheld category above 80cc, CARB supports the change in weight limits for handheld equipment. CARB commented that the increase of one kilogram, representing the approximate additional weight related to switching to a four-stroke engine, is an appropriate adjustment.

Honda submitted comments in agreement with EPA's proposal that would allow engines less than 80cc to comply with both handheld exhaust and evaporative emission standards. Honda commented that the language on evaporative emissions should be clarified to include these engines. Additionally, Honda commented that engines above 80cc could then use the equipment-based handheld definitions to quality for the handheld category. Honda recommended that EPA specifically add earth rammers to the handheld category rather than continuing to rely on the Phase 2 guidance that they qualify as handheld products. Finally, with the direct inclusion of 0 to 80cc engines in the handheld emission category, Honda believes the proposal's definition for handheld equipment should be given careful reconsideration. This may be particularly true for products with weight limits of 14 or 20kg. Honda questioned whether it is necessary for generators and pumps less than 14kg (15 kg proposed) to be considered handheld by definition.

Letters:

Commenter	Document #
OPEI	0675
EMA	0691
CARB	0682
Honda	0705

Our Response:

EPA does not believe the regulations contain two different definitions of handheld. The EPA regulations define "handheld" in §1054.801 by specifying the criteria that are to be used to determine if an equipment application is handheld and therefore subject to the various handheld requirements of Part 1054. Section 1054.101 describes which exhaust standards apply to the different types of engines. Paragraph (a) notes that all handheld engines (i.e., those that meet the definition in §1054.801) must meet the handheld exhaust standards. In addition, paragraph (c) notes that all engines at or below 80cc will be subject to the handheld engine standards, regardless of the type of application the engine is ultimately placed in. The provision in paragraph (c) does not mean the engine is a handheld engine. It only means that the engine is subject to the handheld exhaust standards. Therefore, EPA believes both of the regulatory provisions noted above are necessary and have been retained in the final rule.

In response to the comment on the 80cc cutpoint, EPA cannot use 80cc as the only criteria for whether an engine is subject to the handheld exhaust standards because there are many products that use engines above 80cc which qualify under the criteria contained in the handheld definition of §1054.801. CARB uses the 80cc cutpoint in its regulations. However, CARB's regulations do not apply to those products above 80cc considered handheld under EPA's definition due to the construction and farm equipment pre-emption provisions of section 209(e) of the Clean Air Act. Therefore, EPA is retaining a definition of "handheld" in the final rule.

It should be noted that the proposal based the cutpoint for the applicability of the handheld provisions on engines "less than" 80cc. As noted in the proposal, this change was intended to harmonize with the displacement-based requirements for CARB. During development of the final rule, it came to EPA's attention that the CARB cutpoint is based on engines "at or below" 80cc. EPA has modified the final rule regulations to include this approach so that the EPA and CARB requirements are the same.

With regard to the comments on hand-supported jackhammers, rammers and compactors, EPA agrees that the definition of handheld should include a specific reference to such applications. In response to requests from equipment manufacturers in the past, EPA has approved the manufacturers' request to consider such applications as handheld based on the criteria spelled out in the handheld definition on multi-position use. Therefore, EPA believes it makes sense to include the hand-supported jackhammers, rammers, and compactor applications specifically in the handheld definition.

With regard to the comment on augers, EPA is removing the "one-person" term from the auger description in the handheld definition. EPA acknowledges that some augers can be operated by two people, but still have other attributes that would lead to the equipment being considered a handheld application, including the dry weight of the equipment. Therefore, EPA believes the "one-person" terminology is not needed with respect to augers.

In response to the comments on whether a special provision for pumps and generators is needed given the requirement that all engines at or below 80cc can meet the handheld standards, EPA investigated the current certification information to see how many engines above 80cc are used exclusively in pumps and generator applications that would fall under the 15 kilogram weight limit (engine and equipment combined) included in the proposed definition. While EPA was able to identify a few engine model used in such applications, sales of such engines were extremely low. EPA sees no technical reason why such applications would need to use engines certified to the handheld standards and is therefore removing the pump and generator language from the handheld definition in §1054.801 of the regulations

In response to the comments on the proposed weight limits in the handheld definition, EPA looked at similar equipment applications in which the engine is similarly sized, but powered by either a 4-stroke engine or a 2-stroke engine. Based on an analysis of similarly designed string trimmers, the dry weight of a 4-stroke trimmer with a 25 cc engine was advertised at 13 pounds, whereas the dry weight of two different 2-stroke trimmers with similar sized engines (24.5cc and 28cc) was advertised at 9.5 and 10.6 pounds. Therefore the 2-stroke trimmers were 3.5 and 2.4 pounds (1.6 and 1.1 kilograms) lighter than the 4-stroke trimmer. Based on this comparison, EPA agrees that it is reasonable to raise the weight limits in the handheld definition by 2 kilograms instead of the proposed 1 kilogram increase to account for the increased weight of switching to a 4-stroke engine. Therefore, EPA is adopting a 16 kilogram weight limit in the handheld definition for most equipment with a 22 kilogram weight limit for augers.

Finally, with regard to Honda's comments that the language on evaporative emissions should be clarified to include all engines at or below 80cc under the handheld evaporative requirements, EPA agrees in principle. For the purposes of the exhaust emission standards, engines at or below 80cc are subject to the handheld exhaust standards. Under the new regulations, equipment manufacturers are allowed to use engines at or below 80cc in either handheld or nonhandheld equipment. Because the applicability of the evaporative emission standards is based on the type equipment, an engine at or below 80cc used in a nonhandheld piece of equipment (that is subject to the handheld exhaust standards) would be subject to the nonhandheld equipment evaporative standards. EPA believes this could be difficult, especially with regard to running loss requirements that apply to nonhandheld equipment but not handheld equipment. Therefore, the final regulations require nonhandheld equipment to comply with the nonhandheld evaporative emission standards unless it is using an engine at or below 80cc. In that case, the equipment manufacturer would need to demonstrate compliance with both the fuel line and fuel tank requirements in 2012. The running loss requirement would not apply to nonhandheld equipment using engines at or below 80cc. (It can be noted that EPA is adopting a similar provision for nonhandheld engines which are used in handheld equipment. In such a case the equipment would be subject to the handheld evaporative emission standards which do not require control of running losses. The fuel line and fuel tank requirements would apply and take effect in 2012.)

2.1.2 Small SI vs. Large SI

What Commenters Said:

EMA noted that the current differentiation between Small SI and Large SI nonroad engines is principally determined based on the power of the engine (e.g., less than or equal to 19 kW). In addition, engine manufacturers have the discretion to categorize engines that have power greater than 19 kW, but less than or equal to 30 kW, with total engine displacement less than or equal to 1,000 cc, as Small SI engines. The current differentiation should not be changed.

EMA noted that the NPRM introduces restrictions regarding total engine displacement through the addition of one significant figure to the displacement determination, and provides a clarification stating that all engines produced must be included in the displacement determination. Such clarification requires that all production tolerances be included in the determination of maximum production displacement. EMA commented that the regulatory requirements should be clarified in order to avoid confusion regarding the product category applicability, and the final rule should include the proposed clarification that all engines, including tolerances, must be within a category. However, the proposed additional significant figure for representation of engine displacement is not necessary. In fact, the addition of such significant figure may result in unintended consequences associated with engine designs that are currently classified as Small SI. Accordingly, EMA commented that EPA should not require that engine displacement be calculated to an additional significant figure.

EMA noted that §90.116(a) requires the total engine displacement to be rounded to the nearest whole cubic centimeter, but paragraph (g) requires the total displacement to be rounded to the nearest 0.1 cc. EMA suggested that §90.116(g) be revised to reflect the nearest whole cubic centimeter as required by §90.116(a).

EMA commented on §1054.615(b) "What is the exemption for engines certified to standards for Large SI engines?" EMA noted paragraph (b) refers to paragraph (f) of the same section, however the section does not include a paragraph (f). EMA believes the correct reference should be to paragraph (d).

Kohler noted that EPA is proposing to modify the criteria used to determine the displacement for the large SI one liter exemption. Kohler commented that it is opposed to this change. Kohler provided comments on specific sections in the proposed regulations. They noted that §90.116(g) has been added which limits the displacement of each engine produced to 1000.0 cc after rounding to the nearest 0.1 cc. This is a change to the previous requirement of calculating displacement using nominal engine values and rounded to the nearest whole cubic centimeter. This changes the rules established in §1048.6l5(a)(l) and 90.l 16(a) after the regulations have been implemented. Kohler requested that the previous wording be retained. If it is not, any engine families certified to the current Part 90 wording should be grandfathered and this change should not take effect until the Phase 3 regulation is implemented in 2011. Kohler noted that §1054.140(d) limits the displacement of each engine produced to 1000.0 after rounding to the nearest 0.1 cc. This is a change to the previous requirement of calculating displacement using nominal engine values and rounded to the nearest whole cubic centimeter. Kohler doesn't believe this change is justified and requested the current wording in Part 90.116 be retained.

Letters:

Commenter	Document #
EMA	0691
Kohler	0703

Our Response:

We agree with the commenters' position that the differentiation between Small SI and Large SI engines should not be changed, and specifically that the 1000 cc threshold should not be changed to 1000.0. If we had done this originally, manufacturers could have easily planned for that and taken steps to ensure that nominal engine dimensions and production tolerances were adequately controlled to stay below the threshold. Since we did not adopt the more precise threshold, manufacturers have in good faith designed their engines consistent with the regulations as published. We do not believe there is a sufficient environmental benefit corresponding to the more precisely defined threshold to justify the costs associated with modifying engine designs in this way.

The concern related to ensuring that every engine is below the threshold comes from the realization that we might have had a difficult time establishing that there was a violation if the manufacturer had declared a nominal value that was below the threshold, even though production variability could arguably lead to substantially higher displacement values. In the context of highway motorcycles that are subject to different standards if they are over 50 cc, we have seen examples of wide variations in displacement values above 50 cc where the manufacturer claimed to be in compliance with regulatory requirements. Kohler has pointed out that their particular situation involves production variability that would be problematic if the threshold were 1000.0 cc, but not if the threshold were 1000 cc. We are modifying the regulatory language to specify that the declared displacement value must be within the range of actual values for production engines, taking into account normal production variability. This approach is similar to what we specify for declaring maximum engine power in §1054.140. This should allow us to meaningfully implement and enforce the 1000-cc threshold without changing the meaning of the current regulations for those who are already complying in good faith.

We have modified the regulation language to more clearly state that engines voluntarily certified to the exhaust emission standards for Large SI engines in part 1048 are also subject to evaporative emission standards under part 1048. Since Large SI evaporative requirements fall to the engine manufacturer, there should not be a situation where an equipment manufacturer becomes subject to EPA standards because of the engine manufacturer's choice to certify to more stringent exhaust emission standards. In fact, equipment manufacturers may in the end meet evaporative requirements for Small SI engines (especially for running loss control) even though they don't need to. This would not be a violation. We believe this regulatory arrangement represents the clearest and most natural division of responsibilities among the affected companies.

2.1.3 Maximum engine power and displacement

What Commenters Said:

EMA believes the NPRM introduces significant additional complexities with respect to the determination of maximum power. EMA commented that the final rule should clarify that the power reported by the engine manufacturer may appropriately be determined utilizing the engine manufacturer's good engineering judgment and the appropriate industry standard for power measurement.

EMA commented on §1054.140 "What is my engine's maximum engine power and displacement?" EMA believes the proposed language is both excessive and incomplete. Specifically, they commented that the requirement to map engines pursuant to 40 CFR Part 1065 is not appropriate for small air cooled Small SI engines, and the maximum engine power does not specify a rating procedure. The proposed requirement to include all engines in the displacement determination, as well as including the additional significant figure to the displacement reporting is not appropriate. EMA believes this section should include only those requirements that are significant to the determination of whether an engine family should be classified as a Small or Large SI engine. Accordingly, EMA commented that this section should be revised to read as follows:

> (a) An engine configuration's maximum power is the power level assigned by the engine manufacturer as determined using an industry standard power measurement procedure. Engine families where the maximum modal power of the emission-data engine is greater than 15 kW at the test speed designated require manufacturers to include the brake power for engines in the certification application for the family as prescribed by 1054.205.
> (b) An engine configuration's displacement is the intended swept volume of all the engine's cylinders. The swept volume of the engine is the maximum product of the cross section area of the cylinder bore, the stroke length, and the number of cylinders including all tolerances. Determine the final value by rounding the final result to the nearest 1 cc.
> (c) Deleted in its entirety.
> (e) Deleted in its entirety.

EMA noted that §1054.1(a)(1) states that the requirements of Part 1054 apply to engines with "maximum engine power at or below 19kW." EMA commented that it is not clear what type of power level is being described. As the definitions set forth in §1054.801 include a definition of "brake power," EMA commented that §1054.1(a)(1) should be revised to read as follows: "maximum engine brake power at or below 19kW."

OPEI noted that EPA explains in 1054.205(a) that this section only applies if the engine is 15 kW or greater. OPEI commented that the language of §1054.140 should be modified to explain it is not applicable to engines less than 15 kW or less than 0.95 liters.

Kohler noted that §1054.801 defines "Displacement" to have the meaning given in 1054.140, which is changed from the current provisions in §90.116. Kohler commented that the current meaning in §90.116 should be retained. Kohler also objected to the extensive reporting and recordkeeping requirements in the proposed rule. One of the items Kohler noted was the requirement to report maximum engine power in the application for certification.

Letters:

Commenter	Document #
EMA	0691
OPEI	0675
Kohler	0703

Our Response:

Appropriately defining terms to establish an engine's displacement and maximum engine power are important for ensuring that the regulations specify objectively and consistently which emission regulations apply. Every engine should be unambiguously subject to a single set of emission regulations—there should be no overlaps or gaps. For maximum engine power, the regulations need to differentiate Small SI engines from Large SI engines (and in some cases from recreational vehicle engines). For displacement, the regulations need to assign each engine to a Class for determining which standards apply under part 1054. EMA accurately summarizes our objective by stating that we should "include only those requirements that are significant to the determination of whether an engine family should be classified as a Small or Large SI engine."

Part 90 in particular does not include such procedures and specifications for establishing clear and objective determinations of power and displacement. We have chosen to adopt the new approach in part 1054 in combination with the Phase 3 standards rather than introducing these regulatory provisions as amendment to the Phase 2 program in part 1054. Such a change could cause unintended consequences by forcing an engine to be subject to a different set of standards even though we are intending to leave the current standards intact.

To accomplish this, the regulations must use consistent and objective parameters for making these determinations. It would not be appropriate to rely on a manufacturer's judgment in establishing maximum engine power, because it would be impossible to ensure a proper delineation between Small SI and Large SI engines. Without an objective specification or procedure, manufacturers would be free to manipulate the declared value to choose the less stringent standards. Both maximum engine power and displacement can be measured using standard procedures and specifications, so we believe the regulation should rely on these procedures and specifications to determine those values.

While engine mapping is not required to test Small SI engines, we believe it is entirely appropriate to do engine mapping for engines where there is a need to demonstrate that the engine's power falls within the specifications for regulation as a Small SI engine. Mapping procedures are specified in part 1065. This measurement can be readily made when an engine is mounted on an engine dynamometer. The specified mapping procedure and the instructions for determining maximum engine power constitute a complete rating procedure for these engines. This may be different than the manufacturers' current practice, but it is a rating procedure nonetheless.

We specify that the power and displacement values determined under §1054.140 fall within the range of actual values from production engines. Any departure from this would clearly be inappropriate, since the production engines clearly would not be appropriately represented by those values determined during the certification process. We describe in Section 2.1.2 how we specify displacement limits relative to the 1000 cc threshold for Large SI engines.

The regulations use consistent and appropriate terminology to characterize maximum engine power. Brake power is a separately defined term to clarify which accessory loads are properly counted toward any measured power value. The regulations in §1054.140 simply specify that maximum engine power is the maximum value of an engine's measured brake power over an engine map.

It would not be appropriate to limit the applicability of §1054.140. This section establishes definitions and specifications that dictate how the regulations apply. These definitions apply universally, but by themselves they require no action. Other regulatory provisions, such as the requirements to report maximum engine power in §1054.205, determine whether action is required to make a demonstration.

We proposed to require manufacturers to report their maximum engine power for engines with a measured power at or above 15 kW under the specified emission test procedure. This was intended to require this reporting only as needed to ensure that engines were not exceeding 19 kW based on the proposed approach to defining maximum engine power. We believe we can more carefully craft this provision, given the 30 kW threshold that applies for engines with total displacement at or below 1000 cc. As a result, we are modifying the regulation to require reporting of maximum engine power only where the maximum power for testing is at or above 25 kW for engines with total displacement at or below 1000 cc, and above 15 kW for larger engines.

2.1.4 General concerns

What Commenters Said:

J. Snell would like to urge EPA to leave small engines exempt from emission controls. The commenter believes it would raise the price of items like lawn mowers, pressure washers and go karts which do not have a large enough impact on the environment to justify this increase especially in rural areas. The commenter stated EPA could at least consider a horsepower or a cubic centimeter limit. The commenter also believes that 4 cycle motorcycles should also be exempt for they are a tiny percentage of the machines in the world that put out emissions.

Letters:

Commenter	Document #
J. Snell	0623

Our Response:

The Clean Air Act directs us to set emission standards for nonroad engines, including all Small SI engines, such that we achieve that greatest degree of emission control possible after considering lead time, costs, and other factors. We have made an extensive effort to set standards that are achievable with costs that are commensurate with the air quality benefit associated with the reduced emissions. We are not changing the emission standards that apply for highway motorcycles.

2.2 Standards and lead time

2.2.1 NHH standards–level

What Commenters Said:

EMA noted that they were an active participant in the development of the NPRM for the next-phase Small SI engine standards. EMA commented that the net result of that collaborative process is an NPRM that truly and properly reflects the maximum achievable emission reductions for Small SI engines and the equipment that they power. EMA commented that the rulemaking has set forth extremely challenging and dramatic, but nonetheless potentially achievable, emission reduction targets. Indeed, EMA believes the effort that has gone into this collaborative rulemaking has resulted in the promulgation of an overall framework of technology-forcing standards and accompanying regulations that are at the very limit of feasibility and implementability. As a consequence, EMA commented that the overall framework needs to be maintained in the final rule, since any potential increased stringency of the proposed standards or the overall regulatory program would necessarily result in an infeasible and non-implementable rule.

EMA commented that exhaust emission control technologies for ground supported Small SI engines are similar to, but cannot be derived from, other nonroad engine applications or on-highway applications. Ground supported Small SI engines and the equipment that they power operate under significantly different environmental and cost considerations. Such considerations pose major obstacles to any wholesale transfer of advanced exhaust emission control systems and necessarily prevent the fuel and exhaust control technologies used in on-highway (or even nonroad large spark-ignition) from being applicable to these products.

MECA commented that it supports EPA harmonizing HC+NOx exhaust emission standards for Class I and Class II engines used chiefly on nonhandheld equipment with the CARB standards that were adopted in 2003 and began their implementation in 2007. MECA also concurs with the EPA staff analysis and conclusion that the proposed Phase 3 HC+NOx exhaust emission standards for Class I and Class II engines are technologically feasible and that catalyst technology can be fully optimized as part of a complete engine/emission control/exhaust system to help achieve these proposed limits.

MECA noted that both EPA and CARB test programs have shown that catalysts can be applied to Class I and Class II engines without increasing safety risks associated with exhaust component surface temperatures. Integration of catalyst into small engine mufflers utilizes uncomplicated manufacturing techniques that should allow for the design and validation of compliant engines within the lead-time provided by the EPA regulations. The 30 years of catalyst experience in general and the over 10 years of experience with applying catalysts to smaller SI on-highway and nonroad engines provide an experience base that has enabled catalyst technology to continue to be improved. This small engine experience has provided an increased understanding of how to optimize the engine/catalyst/exhaust system to work effectively, and will facilitate application of catalyst technology on Class I and Class II engines to help meet the proposed standards.

MECA commented that issues raised by small off-road engine and equipment manufacturers, such as heat management, packaging, poisoning, and durability, are straightforward engineering challenges that are well understood and can be readily addressed. They noted that these types of issues have been raised virtually every time the use of catalyst technology has been proposed for use on a spark-ignition engine, be it an automobile, heavy truck, off-road engine over 25 hp (such as a forklift), a motorcycle or moped, or a small engine used on handheld or non-handheld equipment. In each case, all of these issues were successfully addressed for each application through sound engineering principles and design strategies. MECA believes the situation is no different in the case of Class I and Class II nonroad engines.

CARB supported the HC+NOx exhaust emission standard levels proposed by EPA.

NESCAUM supported EPA's effort to harmonize the federal emissions standards with those standards already adopted in California. In many respects, the proposed federal standards are identical to or analogous with California standards. This approach will make it easier for the engine and equipment manufacturers to provide 50-state products to the U.S. market.

Environmental Defense supported EPA's proposal to set more stringent HC and NOx standards for Class I and II nonhandheld small spark-ignition engines and a new CO standard for use in marine generator applications. These Phase III standards can be met by the use of catalysts, improved engine or fuel delivery systems, or the addition of electronic controls or fuel-injection systems. According to EPA, several engine families selling nationwide currently produce engines that meet the proposed Phase III standards. Therefore, "a number of families either will not need to do anything or will require only modest reductions" in order to comport with the new federal standards. The proposed standards are consistent with those previously adopted by CARB. Once in place, EPA's proposal should achieve emissions reductions of approximately 35% below the current federal levels.

The National Association of Clean Air Agencies (NACAA) commented that it supports the federal adoption of exhaust emission standards for small spark-ignition engines consistent with those adopted by the California Air Resources Board. Based on the EPA's March 2006 safety study and the Regulatory Impact Analysis for this proposal, as well as public statements by engine makers, it is evident that additional, more stringent emission standards are feasible for small spark-ignition engines, especially commercial equipment, which operates hundreds, if not thousands of hours a year. Therefore, NACAA recommended that EPA consider adding another tier of more rigorous standards for Class I and Class II engines.

The Pennsylvania Department of Environmental Protection (DEP) commented that it supports EPA's adoption of a regulation for small spark-ignition engines and equipment that is consistent with regulations adopted by the CARB. Consistent with EPA's findings set forth in the March 2006 Safety Study and the Regulatory Impact Analysis for the proposed rulemaking, the Pennsylvania DEP recommended that EPA add a tier of more stringent standards for Class I and Class II engines.

The Mid-America Regional Council (MARC) Air Quality Forum commented that because EPA and small engine manufacturers have both asserted that Class I and II engines can be feasibly designed to meet emissions standards more rigorous than those in the proposed rule, EPA should consider incorporating an additional tier of more stringent standards.

The Wisconsin Department of Natural Resources (DNR) commented that EPA should consider adding another tier of more rigorous emission standards for Class I and Class II spark-ignition engines as more stringent emission standards are feasible for these engines, especially commercial equipment, which operate hundreds, if not thousand of hours a year.

The New York Department of Environmental Conservation (DEC) noted that EPA is proposing standards similar to existing California standards for small spark-ignition engines.

The proposed standards, to be implemented in 2011 and 2012, will result in a 35% reduction in combined hydrocarbon and NOx emissions for engines in non-handheld equipment. The New York DEC noted that it is well aware of industry opposition to these proposed regulations, and supports expedient adoption of the standards as proposed. They also believe that further emissions reductions are needed, and will be feasible in the future.

Environmental Control Corporation (EVCC), a developer of catalytic mufflers for small spark-ignition engines (both two-stroke and four-stroke) commented that their technology has proven HC+NOx reductions of up to 98.9% on a two-stroke engine and 90% on a four-stroke engine while also significantly reducing CO. They noted that they are in full support of the current regulations, but they encouraged EPA to set even more stringent standards in the near future.

EVCC provided information on their catalytic mufflers. First, EVCC noted that its patented catalytic muffler is linearly designed and can be modified to fit virtually any spark-ignition engine. EVCC has successfully completed emissions testing for a variety of engine applications (both two-stroke and four-stroke), including lawn mowers, snowmobiles, out-board motors, water-pumps, and more. The company just recently completed a durability test on a 163 cc four-stroke engine (in compliance with EPA and CARB certification parameters), and is currently in the process of completing durability testing for a two-stroke application. Second, EVCC noted that its catalytic mufflers are both cost-effective and compact in size. The unique airflow design of these mufflers allows them to achieve unprecedented emission reductions while using minimal materials and space. In its most recent 163cc four-stroke test (lawn-mower application), EVCC noted that its catalytic muffler was smaller than that of the OEM and did not require external air, baffles, perforated pipes or sound chambers.

EVCC noted that it is very concerned that EPA plans to continue regulating the emissions of small non-road engines by grouping HC and NOx together as one value. EVCC commented that manufacturers of four-stroke spark-ignition engines (i.e. lawn and garden equipment) are able meet both current and future emission regulations for CO and HC+NOx by engine modifications and minor carburetor calibrations (by running the engine on a lean fuel mixture, for example). While EVCC believes these engine modifications and minor carburetor calibrations will reduce CO and HC, in most instances there will be a concomitant increase in NOx. This is highly undesirable, as increases in NOx will have a drastic impact on both human health and the environment.

EVCC noted that the emission regulations in which HC and NOx are combined together for a total emission certification value permits an increase in NOx levels as a trade-off to reducing HC. This loop-hole is completely unnecessary in the small engine sector, as three-way catalytic converters are fully capable of reducing all three emission values simultaneously. In addition, NOx is one of the most harmful by-products of fossil-fuel combustion, and manufacturers should by no-means be permitted to increase NOx levels needlessly. All three of the emission values in question are individually regulated in the automotive sector, and it is now time to carry this practice to the small engine industry.

Frank Smith, a retired Chemistry Professor from the Memorial University of Newfoundland, commented that in changing the emission regulations applicable to small spark-ignition engines, the requirements should be set such that the technology exists to achieve the levels selected. In that respect, the ability of catalytic mufflers developed by Environmental Control Corporation (EVCC) should be seriously considered. These devices have been tested both at Environment Canada's test facility and at Carnot Emission Services establishment. In January 2007, at the latter facility, results over an extended test of 125 hours, achieved for a four-stroke engine (Honda GX-160), included NOx emissions of less than 0.5 g/kW-hr, HC emissions of less than 5 g/kW-hr, and CO emissions of less than 300 g/kW-hr of operation, without reduction of performance.

In the same tests the combined HC+NOx emissions were also less than 5 g/kW-hr. Consequently, for all pollutants considered the emissions were well below those of current CARB regulations and also those proposed by EPA. In June 2006, tests of EVCC's catalytic muffler fitted to a two-stroke 185 cc Class I nonhandheld engine at Environment Canada's test facility gave similarly low emissions of all three pollutants. A six-mode test (in accordance with US EPA and CARB regulations) using 20 LPM of air injection in the catalyst was conducted by officials at Environment Canada. Of particular interest is the 99 % reduction achieved in hydrocarbon emissions from around 250 g/kW-hr with the original muffler to 2.5 g/kW-hr with the catalytic muffler. This data strongly suggests that control of all three pollutants separately is feasible at levels below those currently proposed.

Letters:

Commenter	Document #
EMA	0691
MECA	0668
CARB	0682
NESCAUM	0641
Environmental Defense	0648
NACAA	0651
Pennsylvania DEP	0676
MARC AQ Forum	0696
Wisconsin DNR	0663
NY DEC	0659
EVCC	0608
EVCC	0654
F. Smith	0694

Our Response:

Section 213(a)(3) of the Clean Air Act specifies the criteria EPA must use in establishing new emission standards. Under the statute, EPA is directed to set emission standards that achieve the greatest degree of emission reduction achievable through the application of technology which EPA determines will be available for the engines or vehicles to which such standards apply, giving appropriate consideration to the cost of applying such technology within the period of time available to manufacturers and to noise, energy, and safety factors associated with the application of such technology. In addition, and specific to this rulemaking only, under section 205 of PL 109-54, EPA, in coordination with other appropriate federal agencies, was required to complete and publish a technical study analyzing the potential safety issues associated with the proposed standards, including the risk of fire and burn to consumers in use. The technical study was to be completed and published before the publication of the notice of proposed rulemaking. Given these criteria and requirements and our assessment of the comments, EPA continues to believe that the proposed Phase 3 standards are the appropriate standards for nonhandheld engines for the years in which they were proposed for implementation. (See Section 2.2.2 for further discussion of the comments on lead time for the Phase 3 nonhandheld engine standards.)

The Phase 3 standards for nonhandheld engines are technology forcing and are expected to result in the use of modified calibrations, engine improvements, catalysts, and fuel injection to achieve the required emission reductions. The mix of technologies will vary depending on the engine design. As detailed in Chapter 4 of the Final RIA, EPA developed several aftertreatment and fuel-injection systems to demonstrate that the Phase 3 standards could be met. In addition, EPA assessed the impacts of the new standards on cost as detailed in Chapter 6 of the Final RIA. Finally, EPA expended considerable effort in analyzing the potential safety impacts of engines designed to meet the proposed Phase 3 standards to comply with the requirements of section 205 of PL 109-54. ("EPA Technical Study on the Safety of Emission Controls for Nonroad Spark-Ignition Engines < 50 Horsepower," EPA420-R-06-006, March 2006, docket item EPA-HQ-OAR-2004-0008-0333.) Taking all of this information into consideration, EPA believes the Phase 3 standards meet the criteria specified in the Clean Air Act for the time frame in which the standards are to be implemented.

EPA received several comments that we should set more stringent standards than those being adopted today, but we do not concur. All of these commenters except one (as noted below) provided no supporting analysis or data on any of the relevant statutory factors in support of their request. One commenter did submit emission data showing very low emission levels for a Class I engine. In fact, EPA itself generated emissions data for the proposal showing low levels as well. For example, in Class I, EPA tested a number of engines that had HC+NOx emission levels as low as 3.9 g/kW-hr at low hours and were projected to be as low as 5.7 g/kW-hr HC+NOx at the end of their regulatory useful life. Likewise, for Class II engines, EPA tested engines with HC+NOx emission levels as low as 1.8 g/kW-hr at low hours and projected to be as low as 2.3 g/kW-hr at the end of their regulatory useful life. (All of the emissions data generated by EPA and summarized here, is presented in Chapter 4 of the Final RIA.) However, as noted above, the requirements for establishing new emission standards are dependent on more than demonstrating certain emission levels. So while EPA had its own emission data showing lower emission levels are achievable, EPA determined for the proposal that under section 213(a)(3) of the CAA, the Class I standard of 10.0 g/kW-hr HC+NOx and the Class II standard of 8.0 g/kW-hr HC+NOx were the appropriate emission standards. Section V.G. of the proposed preamble and Chapter 4 of the Draft RIA for the proposed rule laid out EPA's assessment of the proposed standards in the context of all of the CAA criteria. As noted above, none of the commenters asking for more stringent standards addressed these other factors.

In addition, in Chapter 11 of the draft RIA for the proposed rule, for both Class I and Class II engines, EPA considered the appropriateness of more stringent emission standards (i.e., 8.0 g/kW-hr HC+NOx for Class I engines and 4.0 g/kW-hr HC+NOx for Class II engines) based on the CAA criteria. EPA noted that while more stringent standards may be feasible, EPA concluded that more leadtime would be required for such standards. This was based on the fact that more stringent standards would require more fundamental and significant changes in engine design in both Classes I and II. For Class I engines, we projected that manufacturers would likely need to convert their side valve engine designs (which represent two-thirds of sales currently) to overhead valve designs along with using a more efficient catalyst and addressing emissions deterioration. For Class II engines, we projected that manufacturers would need to convert all engines to fuel injection, upgrade their residential engine designs to improve emissions deterioration characteristics (e.g., those with a 250 hour useful life), and use a more efficient catalyst. Such redesigns would involve significantly more development work for all manufacturers (and likely more cost) compared to the changes projected for the Phase 3 standards adopted in this rule. This could not happen as soon as the 2011 and 2012 timeframe being adopted for the Phase 3 standards, and would result in a delay in achieving air quality benefits.

In further response to comments that EPA should have promulgated more stringent standards than we proposed, it is important to note that setting more stringent standards for either Class I or Class II or both, would require a more robust analytical record. Those suggesting that more stringent standards should be established now (either in a single or two phases) did not provide input on factors such as cost, lead time, and the other CAA criteria for public consideration. EPA could have pursued such further analysis at this time, but it would likely have required an additional notice/comment step which would further delay this action. The states with air quality problems would benefit more from the earlier reductions due to the standards being adopted in this final rule rather than waiting for further reductions. Therefore, EPA concluded that the proposed Phase 3 standards (which we are adopting with today's rule) are the appropriate standards under the CAA.

With regard to the comment on having separate HC and NOx standards instead of a combined HC+NOx standard, EPA is retaining the standards based on a combined HC+NOx level as is the case with the current Phase 2 standards. EPA believes a combined standard offers flexibility to manufacturers in designing technology to comply with the standards, especially since not all engine designs respond identically to the same control techniques in catalyst design where it is generally easier to reduce HC emissions compared to NOx emissions. While it is true that mathematically a combined standard could result in a decrease in overall HC+NOx emissions with a rise in NOx (or HC), EPA does not expect that would happen to any significant degree as manufacturers redesign engines to comply with the Phase 3 standards. This is especially true if a manufacturer uses a catalyst to comply with the Phase 3 standards because a catalyst would be expected to reduce both HC and NOx, although not at the same rate. This also would likely be true for those engines that might rely on engine modifications to comply with the Phase 3 standards. The latter conclusion is based on a comparison of three 2008 model year Class II engine families that have certification levels below the Phase 3 standards compared to similarly sized Phase 2 engines from the same manufacturer. For this comparison, all of the engines were OHV engines and were certified without catalysts. In all three cases, the overall

HC+NOx emissions for the 2008 model year engines were lower by up to 27 percent, and the individual HC levels and NOx levels were also lower. While most of the decrease in HC+NOx emissions was from decreases in HC emissions, the NOx emissions decreased in all cases as well. Therefore, while a combined HC+NOx standard has the potential to lead to higher levels of one pollutant relative to that pollutants level under the Phase 2 requirements, EPA believes that the Phase 3 HC+NOx standards should also result in lower HC emissions and lower NOx emissions for the fleet.

Additionally, it should be noted that the Phase 3 standards being adopted by EPA are the same as those adopted by CARB, which are based on the combined HC+NOx level. Having the same requirements as CARB helps manufacturers by allowing them to certify the same designs with both agencies, which might not be possible if EPA were to adopt separate HC and NOx standards. In addition, it is important to note that the further control of HC and NOx emissions from these engines is being driven by the need to reduce ambient ozone concentrations. Both HC and NOx contribute to the formation of tropospheric ozone, so a slight mix in the relative reductions among engine designs does not deter achieving the ozone air quality improvement goal which is a key basis for this action.

2.2.2 NHH standards–lead time

What Commenters Said:

OPEI commented that under Section 213 of the Clean Air Act, EPA must make sure that adequate lead-time is provided to allow all equipment manufacturers, as well as their separate engine and exhaust system suppliers, to develop and test the new materials, technologies, and safeguards, including low-permeation fuel tanks and catalyzed-exhaust systems, and to ensure operational risks are mitigated under all the expected operating conditions including off-nominal conditions. As long as they are provided with adequate lead-time and the other related flexibilities, OPEI noted that its members will be able to design their products to utilize catalyzed exhaust systems that would be required to meet the proposed EPA Phase 3 standards. OPEI provided a number of reasons why any acceleration of the proposed Phase 3 effective dates or dilution of the proposed lead-time flexibilities would undermine and potentially jeopardize the manufacturers' ability to build and test products to ensure they would not have any incremental risks.

First, the inclusion of aftertreatment systems into an equipment manufacturer's exhaust system will require a much broader set of changes than just packaging the catalyst into an existing muffler, as implied by the EPA in the proposed Preamble discussion. Second, non-integrated equipment manufacturers must work closely with a variety of suppliers to design and install all the different components into the final product. Third, it will take an extraordinary amount of time and effort to develop a single piece of equipment with an effective and safe catalyzed muffler that has been thoroughly evaluated – under both nominal and off-nominal conditions. Fourth, given the volumes and diversity of these Class II exhaust systems, and limited resources, OEMs are concerned that there will be several bottlenecks (with all their suppliers, independent test labs, and certification officials) that will further delay the production and certification process. Fifth, most of the non-integrated equipment manufacturers expect they will be forced to offer only limited CARB, Tier III-compliant products for the California market. The national market will require the industry to address many of the most challenging muffler applications and configuration that will not be offered in California.

MECA commented that EPA's proposal to implement the exhaust emission standards for Class I and Class II engines in the 2011-2012 timeframe provides more than adequate lead time for engine and equipment manufacturers. MECA urged EPA not to push out these implementation dates beyond the proposed 2011 and 2012 dates. MECA believes that an even faster implementation schedule for these exhaust emission standards is feasible given the implementation schedule adopted by California.

CARB commented that they believe the timing of the new standards should be implemented sooner. Small spark-ignition engine manufacturers have already been preparing to meet the California standards which are the same as EPA's proposed standards. The manufacturers already have the technological ability to meet the standards. Under EPA's current proposal, manufacturers of Class II engines will have three years from the time California standards have gone into effect and Class I engine manufacturers have five years. It should not take these manufacturers three to five additional years to meet these standards nationwide, particularly since EPA also allows for credit generation which gives manufacturers additional flexibility. CARB suggested that an alternative would be for EPA to give the manufacturers that do not currently sell their products in California extra time to meet the standards.

CARB recommended that EPA modify its proposed HC+NOx phase-in schedule for large spark-ignition engines ≤ 1 L to harmonize with the California small off-road engine exhaust emission standards for Class II engines, 8 g/kW-hr at the 2008 model year. This would provide for significant emission reductions from this category. Furthermore, a harmonized program would help reduce the problem of higher emission 49-state large spark-ignition engines traveling into the California fleet.

NACAA questioned the need for the substantial additional lead time that EPA has proposed beyond the implementation dates enacted by California – five years (until 2012) for Class I engines and three years (until 2011) for Class II engines. They believe an accelerated federal schedule is technically feasible and recommended that EPA give consideration to more rapid implementation.

Pennsylvania DEP commented that they are concerned about the need for the substantial additional lead-time of three to five years proposed by EPA and strongly suggests more rapid implementation to afford greater protection of human health and the environment.

The MARC AQ Forum noted that the proposal sets implementation deadlines 2012 for Class I engines and 2011 for Class II engines. They urged EPA to accelerate its implementation timeline.

NESCAUM commented that they oppose the protracted timelines for compliance with the standards, proposed for manufacturers of small land-based SI engines and equipment. The analogous California exhaust emissions standards are fully phased-in between 2005 and 2008. In contrast, the proposed phase-in period for the proposed federal standards does not even begin until 2010 and, with special provisions afforded to small to medium volume manufacturers, full compliance is delayed until as late as 2014. NESCAUM does not believe there are valid reasons for delaying the incorporation of Phase 3 engines into various types of equipment nationally when manufacturers will already be supplying the California market with lower-emitting Phase III engines and equipment years earlier. This approach for protracted delays is inconsistent with the approach taken in the same rulemaking for SD/I marine engines where EPA chose to closely track effective dates for the California standards: "EPA is proposing that the Federal SD/I standards take effect for the 2009 model year, one year after the same standards apply in California. We believe a requirement to extend the California standards nationwide after a one-year delay allows manufacturers adequate time to incorporate catalysts across the product lines as they are doing in California. Once the technology is developed for use in California, it would be available for use nationwide soon thereafter." NESCAUM requested that the exhaust emission standards for land-based small SI engines be fully implemented, beginning with the 2009 model year, consistent with the proposed compliance dates for SD/I engine standards.

Wisconsin DNR commented that EPA should accelerate the implementation dates of the exhaust emission standards for Class I and Class II small spark-ignition engines consistent with those adopted by CARB.

NJ DEP noted that the CARB standards for exhaust emissions are fully phased-in between 2005 and 2008, whereas the proposed phase-in dates for the corresponding federal standards do not begin until 2010. Of most concern, NJ DEP highlighted the special provisions for small and medium manufacturers which may delay full compliance until 2014. In light of the fact that manufacturers will already be providing cleaner engines and equipment to California and that technology issues will not be a factor, these cleaner engines and equipment should be required to be made available sooner nationwide.

Environmental Defense commented that they object to the much delayed implementation dates for these important standards. EPA's proposed engine exhaust limits for nonhandheld Class I and Class II engines do not go into effect until model year 2012 and 2011 respectively, while California's comparable standards take effect in 2008 and 2009. In justifying the proposed near-term implementation dates for SD/I and OB/PWC standards, EPA relies on the fact that many manufacturers currently design and sell cleaner engines capable of achieving the proposed standards. Environmental Defense agrees with EPA that the availability of cleaner technology weighs in favor of near-term implementation dates since the cost and burden to manufacturers in meeting a more stringent standard is low in this instance. For this reason, they fail to understand why EPA has reached such a different conclusion in setting the implementation dates for the small SI engine exhaust standards. Technological advances in the SI small market, just like those in the SI marine sector, have resulted in the wide-spread availability of cleaner engines capable of achieving greater emissions reductions. In addition, EPA's proposal provides small SI engine manufacturers with substantial flexibility by allowing them to choose from a number of aftertreatment technologies in order meet the new standards. The breadth of available technologies capable of reducing small engine emissions to the proposed Phase 3 levels weighs in favor of shorter implementation dates, not longer. EPA's failure to explain adequately its basis for delaying the implementation dates by some 4-5 years is arbitrary and capricious and contrary to law.

Mr. Dan Holland commented that he opposes delaying immediate and full implementation of the proposed rules. He believes that requiring water craft to comply with the new standards in 2009 but not require "land-based" small engines to comply until 2011 is arbitrary and capricious. There is no need -- or excuse -- to wait until 2011 to implement the new regulations with respect to all new small engines. He believes that proven technology is commercially available now that can make all new small engines compliant with the more stringent, proposed regulations that the EPA is authorized to promulgate. Delaying implementation of the new standards with respect to new land-based small engines until 2011 can only be interpreted as "political" bias in favor of the Senator from Missouri that has long opposed emissions regulation and emissions reduction on the specious grounds that the addition of catalytic converters etc. cause small engines to run "hot" and/or cause external fires, both of which studies by the EPA and others have disproved. Substantial emissions reductions can readily and easily be achieved by adding existing, proven, inexpensive technologies to new engines, and this wait-until-2011 "free pass" for land-based engines is simply unacceptable, and it is legally indefensible in light of Congress's mandate in section 428(b) of the 2004 Consolidated Appropriations Act and existing Section 213(a)(3) of the Clean Air Act which contemplates an immediate business response during a 12-month business-design cycle, not a business cycle "four years from now."

Letters:

Commenter	Document #
OPEI	0675
MECA	0668
CARB	0682
NACAA	0651
Pennsylvania DEP	0676
MARC AQ Forum	0696
NESCAUM	0641
Wisconsin DNR	0663
NJ DEP	0710
Environmental Defense	0648
D. Holland	0595

Our Response:

EPA continues to believe that the proposed Phase 3 standards are the appropriate standards for nonhandheld engines for the years in which they were proposed. (See Section 2.2.1 for further discussion of the comments on the level of the standard for the Phase 3 nonhandheld engine standards.) As noted above, EPA believes the new Phase 3 standards for nonhandheld engines are technology forcing and are expected to result in the use of technologies including engine improvements, catalysts, and fuel injection to achieve the required emission reductions. Engine manufacturers will need substantial time to redesign all of their engine families to comply with the new standards.

A look at the current certification data for the 2008 model year provides useful information to gauge the level of effort required by engine manufacturers to comply with the new standards. (EPA's certification data can be found on the internet at the following site: http://www.epa.gov/otaq/certdata.htm#smallsi) There are a total of 87 manufacturers with nonhandheld engine families certified with EPA. For the following discussion, we have focused on the 15 manufacturers that historically have been selling in the small engine market. (The remaining 62 manufacturers, primarily from China, are recent participants in the small engine market and generally have only 1 to 5 engine families certified with EPA with relatively low sales volumes.) For these 15 manufacturers of nonhandheld engines, there are currently 66 engine families certified in Class I and 121 engine families certified in Class II. (These numbers exclude engines used exclusively in snowblowers which do not have to comply with the HC+NOx standards). While some of these engine families have emission levels below the Phase 3 standards, manufacturers will need to redesign the bulk of the designs to meet the Phase 3 standards. For these 15 manufacturers, EPA estimates that 53 of the Class I engines and 83 of the Class II engines will have to be redesigned to meet the Phase 3 standards. ("Analysis of 2008 Small SI Nonhandheld Engine Certification Data," EPA memo from Phil Carlson to EPA Docket OAR-2005-0008, August 28, 2008, docket item EPA-HQ-OAR-2004-0008-____.)

For the six manufacturers with the highest numbers of nonhandheld engine families (i.e., Briggs and Stratton, Fuji Heavy Industries, Honda Motor Company, Kawasaki Heavy Industries, Kohler Company, and Tecumseh Products Company), EPA estimates that they will need to redesign over 19 engines families, on average, to comply with the new Phase 3 standards. (The range in the number of engine families needing to be redesigned for these manufacturers is from 12 to 35 engine families.) Given that we are finalizing the Phase 3 standards in late-2008, manufacturers will have only 2 years before the Class II engine standards take effect and 3 years before the Class I engine standards take effect. As described below, we believe that engine redesign will require a significant level of effort for engine manufacturers. Given the level effort needed and the number of engine families needing to be redesigned, EPA does not believe it would be possible to reduce the lead time for the new standards.

The Phase 3 emission standards for Class I engines are expected to result in engine improvements and the use of catalysts. Catalysts have been implemented on few of these engines to date and therefore the expected widespread use will require significant technology development and investment from engine manufacturers. In addition to the catalyst brick formulation, other technology requirements include muffler design for desired pollutant conversion (which they will want to optimize for minimum precious metal loading to reduce costs), consideration of regulatory useful life emission requirements, addressing cooling requirements related to muffler skin temperature and exhaust temperature, and testing of the engines in real-world applications. While EPA believes the technological challenges can be met by manufacturers, each of these steps will take considerable resources and time to address for each of their engine families. As noted in Chapter 6 of the Final RIA (as well as Chapter 6 of the Draft RIA for the proposal), EPA estimates that engine modifications will take 4 months of design work and 6 months of development work for each engine design. In addition, EPA estimates that applying catalysts will take 2 months of design work and 5 months of development work for each engine design.

Likewise, the Phase 3 emission standards for Class II engines are expected to result in both engine redesign and the application of catalysts on many engines. For those Class II engines using catalysts, engine manufacturers will need to address the same issues noted above for Class I engines. In addition, they will need to communicate closely with their Class II engine users (i.e., equipment/vehicle manufacturers) since most Class II engines are sold without an exhaust system. Due to the wide number of exhaust systems used on these engines, equipment manufacturers will either have to modify the existing equipment design to utilize a manufacturer provided muffler, or they will have to develop their own muffler using the engine manufacturer's provided catalyst brick specifications and then do the certification of that engine. Although EPA believes these issues can be addressed, all of these efforts will take time. As noted in Chapter 6 of the Final RIA (as well as Chapter 6 of the Draft RIA for the proposal), EPA estimates that engine modifications will take 4 months of design work and 6 months of development work for each engine design. In addition, EPA estimates that applying catalysts will take 2 months of design work and 5 months of development work for each engine design.

Finally, under the Phase 3 program, EPA is requiring the certification of engines using new test procedures under part 1065 by the 2013 model year. These new procedures require engine manufacturers to implement changes to their current test setup in order to incorporate new test cell operation procedures and new emissions calculations. If a manufacturer is going to spend the resources to certify a new engine, they will likely want to do it only once so as to use the carryover data option in certification for a number of years. Therefore, it is likely manufacturers will want to certify in 2011 or 2012 with the new procedures. The effort it will take to convert manufacturer's facilities depends on the age of the manufacturer's current testing equipment and will add to the time and effort required to comply with the new Phase 3 standards.

Given the number of engine families that need to be redesigned, the types of technological issues that will need to be addressed for each engine family, and the new test procedure requirements to which manufacturers will need to convert, EPA believes the 2012 requirement for Class I and 2011 requirement for Class II are the appropriate leadtime for the new standards.

With regard to the comments that EPA should move up the implementation dates because California's Tier 3 standards are already in effect, an analysis of the 2008 model year certification data from CARB for the six engine manufacturers with the highest number of nonhandheld engine families (as noted above) provides some useful information. While CARB's Tier 3 standard for Class I engines took effect in 2007, only 9 out of 29 engine families are certified by these manufacturers at or below the 10.0 g/kW-hr HC+NOx standard. For Class II engines, where the Tier 3 standard takes effect in 2008, only 19 out of 60 engine families are certified by these manufacturers at or below the 8.0 g/kW-hr HC+NOx standard. While these manufacturers have redesigned some of their engines to meet CARB's Tier 3 standards, they are using emission credits to certify the remaining engines. Therefore, even though CARB's Tier 3 standards are already in effect, manufacturers have a significant amount of work to finish certifying their engines for California. We continue to believe the Phase 3 implementation dates of 2012 for Class I and 2011 for Class II provide the appropriate leadtime for manufacturers to redesign their engines to comply with EPA's Phase 3 standards.

2.2.3 CO standard for marine generators

What Commenters Said:

MECA supported EPA's proposal to establish a Phase 3 CO standard of 5 g/kW-hr for marine generators. They noted that existing commercial applications of catalyst-equipped marine generators provide strong evidence that EPA's proposed low CO standard for marine generators is technically feasible.

EMA commented that dedicated marine generator engines that are permanently installed into vessels (such that they can take advantage of features such as water cooling, vessel DC electrical systems, electronic closed loop feedback fuel control systems, and three way catalyst aftertreatment systems) may be able to comply with the proposed CO emission standard (5 g/kW-hr). However, many auxiliary marine engines are either not dedicated to the vessel or are not integrated in a manner consistent with the technology that would be required in order to achieve the proposed CO emission level. Accordingly, EMA commented that the final regulation must clarify that the proposed CO standard is only applicable to the fully-integrated marine generator engines described in the NPRM.

Letters:

Commenter	Document #
MECA	0668
EMA	0691

Our Response:

We agree with EMA that marine auxiliary engines that are not generators should not be subject to the more stringent CO standard. This was reflected in the proposed rule. We do not believe it is appropriate to specify some degree of integration for marine generators before the more stringent standards apply. This information is generally not available to engine manufacturers at the point of certification and it would be difficult to specify an objective measure that would make this enforceable. The final regulation is unchanged, requiring all marine generators to meet the 5 g/kW-hr CO standard.

2.2.4 Useful life

What Commenters Said:

EMA noted that there are a wide variety of usage patterns for the engines and equipment governed by the proposed regulation. EMA commented that the proposed maximum time span of 5 years for the emission durability period is acceptable provided that the final rule clearly states that the durability period is the lesser of either hours or years.

OPEI commented that the last line of the useful life definition, "If an engine has no hour meter, the specified number of hours does not limit the period during which an engine is required to comply with emission standards…" should be deleted. OPEI supported a 5 year time limit on useful life. This means the specified number of hours or 5 years (whichever comes first).

CARB believes that it is appropriate to limit the useful life period to five years or the specified number of operating hours, whichever comes first. Limiting the useful life period would be favorable to both industry and regulatory agencies. It would allow manufacturers to limit warranty coverage by a time period rather than operating hours which can be difficult to determine. For regulatory agencies, it provides more flexibility in limiting the length of time credits may be used.

Letters:

Commenter	Document #
OPEI	0675
CARB	0682
EMA	0691

Our Response:

All the commenters supported the provision that would define the useful life period as five years or a specified number of hours of engine operation, whichever occurs first. We are therefore adopting this provision, including a clear statement that either one of these two age indicators would be sufficient to establish the end of the useful life.

The last sentence in the definition of useful life clarifies how to apply the definition with respect to hours of operation if the engine has no hour meter. Leaving out this specification would leave this ambiguous and would require that we make a judgment in guidance to the industry. We believe it is therefore fitting to include this clarification in the regulation. Moreover, we believe the proposed provision establishes a very reasonable approach, such that the hours-based limit on useful life is meaningful only if the extent of operation can be established without the missing hour meter. For example, if an engine is certified based on a useful life of 250 hours, we would intend to be able to do in-use testing on such engines that have been in service in consumer use in a riding lawnmower throughout the five-year period representing the useful life, unless it is clear that the engine has operated for more than 250 hours (if, for example, the lawnmower has been used in commercial service long enough to demonstrate that it has operated longer than 250 hours.

See Section 2.4.2 for additional discussion related to selection of useful life values for certification.

2.2.5 Crankcase controls

What Commenters Said:

EMA commented on §1054.115(a)(1)(i) "What other requirements apply?" EMA noted that the section states that engines must be manufactured in a way to allow crankcase emissions to be routed into the emission measurement sampling system. EMA commented that it is impractical for an engine manufacturer to meet this requirement given the diversity of exhaust emission measurement equipment. This requirement should be revised to replace the testing requirement with an engineering judgment/test requirement as described in §90.109.

EMA commented on §1054.115(a)(1)(ii) "What other requirements apply?" EMA commented that because the exhaust emission measurements utilized to determine the deterioration factor must include the crankcase emissions pursuant to §1054.115(a)(1), this section's requirement to include deterioration in crankcase emissions in the determination of deterioration factors is illogical. However, if the requirement in §1054.115(a)(1)(i) is revised to incorporate the language from §90.109 (as suggested above), then this section would not require any additional revisions.

Letters:

Commenter	Document #
EMA	0691

Our Response:

It is unclear on what basis manufacturers should be using good engineering judgment regarding an engine's ability to meet emission standards considering vented crankcase emissions if those emissions cannot be measured. We believe emission-measurement systems should be capable of measuring crankcase emissions where a manufacturer would want to make a separate measurement of crankcase emissions for adding to the conventional emission results. This is especially true in the case of dilute testing. However, regardless of the method used to measure emissions, we allow for a test setup in which the engine is modified such that the crankcase emissions are vented into the exhaust before sampling. This should be readily achievable for any system that can make a valid exhaust emission measurement with Small SI engines.

We find it entirely logical to consider measured changes in crankcase emissions over an engine's service life in the determination of deterioration factors. The effect of changing crankcase emissions could be quantified separately (if crankcase emissions are measured separately) or the manufacturer could use a single deterioration factor that combines the crankcase and conventional exhaust emissions at all points.

2.2.6 Safety

What Commenters Said:

OPEI commented that the ability of manufacturers to produce and accurately evaluate the potential hazards of any new technology, including catalyzed mufflers, depends on EPA providing adequate lead-time and all the related proposed flexibilities. There will be substantial development work and costs associated with the development and installation of heat-shielding, and other safeguards to ensure that catalyzed exhaust systems (at the efficiency levels discussed in the proposal) do not pose any increased risks or hazards. As EPA's administrative record demonstrates, any more stringent exhaust standards, or more accelerated effective dates (than those EPA has proposed) would not meet that statutory requirements in Section 213 of the Clean Air Act, including feasibility, safety, lead-time, and costs.

OPEI continued that the industry is becoming much better informed on how to build and evaluate catalyzed products primarily as a result of the continued research and development work internally conducted by manufacturers. Manufacturers are also becoming better informed on the exhaust gas temperatures and the muffler surface temperatures (where grass clippings and other debris could potentially ignite) through the comprehensive study that was released this spring by the National Institute of Standards and Technology (NIST). Manufacturers will become more knowledgeable through the current related study on the heat-related challenges of catalyzed mufflers that has been conducted by the SP Technical Research Institute of Sweden for the International Consortium for Fire, Safety, Health and the Environment (ICFSHE). The OPEI Education and Research Foundation funded both the NIST and SP studies in order to promote our understanding of the heat-related challenges with both catalyzed and non-catalyzed mufflers so that manufacturers can build even safer products that respond to these challenges. From OPEI's perspective, the NIST and SP studies are solely intended to inform manufacturers as they develop new ANSI standards for "Mitigation Of Heat-Related Hazards From Mufflers On All Ground-Supported Equipment". For example, the SP study will ultimately help manufacturers develop procedures (to mimic in their laboratories) the most challenging and complex off-nominal conditions (such as single spark-plug misfire or malfunction on a twin cylinder engine). The EPA and SP studies (as well as manufacturers' current experience in California) also generally confirm the enormous challenges and lead-time needed to design, build and internally evaluate all their diverse catalyzed equipment to ensure these products will be durable, emission-compliant and minimize the risks under the complex, nominal and off-nominal operating conditions.

OPEI commented that while there is still much work that remains to be done, OPEI members are working with all their different suppliers to develop catalyzed products and to draft and finalize the new, helpful ANSI standards. The smaller OEMs (with the least internal staff and resources) will benefit the most from the information supplied in the ANSI process. ANSI standards development is a voluntary consensus-based process. The actual time to develop a standard varies based upon the iterative notice and comment procedures. The ANSI committee is currently on track to develop the final ANSI standards before the Phase 3-exhaust standards are proposed to become effective in 2011.

OPEI stated that EPA's proposed exhaust standards combined with the proposed effective dates should allow time for the entire industry to build catalyzed products that do not increase any risks. The proposed effective dates should allow time for the new ANSI standards to be finalized and issued to the public before the Phase 3 exhaust standards begin to apply.

MECA concurred with the conclusions reached by EPA staff that the application of catalysts to nonroad equipment or marine generators with either Class I or Class II spark-ignited engines can be accomplished using available engineering exhaust system design principles in a manner that does not increase the safety risk relative to today's uncontrolled equipment. In particular, the EPA safety study on non-handheld equipment equipped with catalyzed mufflers represents the most thorough safety study completed to date on this class of spark-ignited engines. The results of this EPA study showed that properly designed catalyzed mufflers pose no incremental increase in safety risk (and in many cases even lower muffler surface temperatures) relative to currently available non-handheld equipment sold without catalysts. Catalysts have also been used voluntarily on lawn mowers in certain European markets since the late 1990s and on a range of handheld equipment with no significant, reported safety issues, providing additional support that catalysts can be integrated into the mufflers of Class I and Class II engines in a safe manner.

During testimony at the public hearing, Mr. Richter of Heraeus noted that they have supplied catalysts for European “green” products in response to certain European states that have requirements for catalyst-based systems on some of their walk behind equipment. Mr. Richter noted that nearly a million walk behind mowers have been produced with a catalyst in Europe in response to these requirements. When asked if he was aware of any problems, performance issues or anything related to use of the catalysts, Mr. Richer responded that there were none whatsoever.

Letters:

Commenter	Document #
OPEI	0675
MECA	0668
Heraeus (hearing)	0642

Our Response:

Section 213 of the Clean Air Act directs us to consider the potential impacts on safety, noise, and energy when establishing the feasibility of emission standards for nonroad engines. Furthermore, section 205 of EPA’s 2006 Appropriations Act requires us to assess potential safety issues, including the risk of fire and burn to consumers in use, associated with the new emission standards for nonroad spark-ignition engines below 50 horsepower. We expect that the new exhaust and evaporative emission standards will have no adverse affect on safety.

In response to industry comment that proposed exhaust standards combined with the proposed effective dates should allow time for the entire industry to build catalyzed products that do not increase any risks, we are finalizing the proposed standards in the years in which they were proposed. Given that we are finalizing the Phase 3 standards in mid-2008, manufacturers will have a little over two years to redesign their Class II engines and a little over three years to redesign their Class I engines.

The safety analysis performed by EPA for Class I and II engines and SP Technical Research Institute for Class II engines both indicate that the addition of catalyst technology can be safely implemented with the proper design strategies. Both of these studies are available in the docket. (“EPA Technical Study on the Safety of Emission Controls for Nonroad Spark-Ignition Engines < 50 Horsepower,” EPA420-R-06-006, March 2006, docket item EPA-HQ-OAR-2004-0008-0333.) (“Scientific Evaluation of the Risk Associated with Heightened Environmental Requirements on Outdoor Power Equipment - Phase II,” SP Technical Research Institute of Sweden, docket item EPA-HQ-OAR-2004-0008-711.1.) In addition, a detailed analysis of both studies is included in a Memo to Docket EPA-HQ-OAR-2004-0008 titled "Nonhandheld SI Exhaust System Safety Analysis."

The scope of our safety study included Class I and Class II engine systems that are used in residential walk-behind and ride-on lawn mower applications, respectively. We conducted the technical study of the incremental risk on several fronts. First, working with CPSC, we evaluated their reports and databases and other outside sources to identify in-use situations that create fire or burn risk for consumers. From this information, we identified ten scenarios for evaluation covering a comprehensive variety of in-use conditions or circumstances that could lead to an increased risk of fire or burn. Second, we conducted extensive laboratory and field testing of both current technology (Phase 2) and prototype catalyst-equipped advanced-technology engines and equipment (Phase 3) to assess the emission control performance and thermal characteristics of the engines and equipment. Third, we conducted a design and process Failure Mode and Effects Analyses (FMEA) comparing current Phase 2 and Phase 3 compliant engines and equipment to evaluate incremental changes in risk probability as a way of evaluating the incremental risk of upgrading Phase 2 engines to meet Phase 3 emission standards.

Our technical work and subsequent analysis of all the data and information strongly indicate that effective catalyst-based standards can be implemented without an incremental increase in the risk of fire or burn to the consumer either during or after using the equipment.

2.2.7 Altitude

What Commenters Said:

OPEI recognized that altitude provisions for handheld engines are controlled by §1054.145(c)(4). This paragraph specifies that handheld engines must meet applicable emission requirements up to an altitude of 1100 feet (96 kPa). Kit information should be supplied in the operator's manual and application for certification. Handheld engines are small, compact and also cannot bear the cost of automatic altitude compensation systems. Such engines also run under high thermal and mechanical load, which make them sensitive to increased air-fuel ratio that would follow having to comply with the emissions standard also at high altitude settings. In general, A/F ratio changes as a function of the square root of the air density/fuel density. This may vary based on unique engine characteristics. Depending on a manufacturer's compliance margin and production line auditing values, OPEI believes the 1100-foot (96 kPa) requirement should be acceptable.

OPEI supported the proposed requirement that altitude kits must be available for non-handheld products sold in geographic locations with higher altitudes. They believe the prescribed ambient pressure limitation for determination of compliance is acceptable and more appropriate than the referenced altitude. The manufacturer's ability to demonstrate compliance with the prescribed exhaust emission standard levels at atmospheric pressures lower than 94.0 kPa should utilize a combination of historical information, engineering analysis, and good engineering judgment in the determination of altitude kit information to be included in the engine family certification application and owner's manual. OPEI commented that the regulatory requirements should be minimized in order to continue to allow the various manufacturer processes that have and will continue to provide this service to their respective customers.

EMA supported the proposed requirement that altitude kits must be available for products sold in geographic locations with higher altitudes. The prescribed ambient pressure limitation for determination of compliance is acceptable, and a more appropriate metric than using actual altitude. However, EMA commented that the manufacturer should be allowed to demonstrate compliance with the prescribed exhaust emission standard levels at atmospheric pressures lower than 94.0 kPa utilizing altitude kit information included in the engine family certification application and owner's manual. Altitude kit design should be determined using a combination of historical information, engineering analysis, and good engineering judgment. EPA should minimize the regulatory requirements in order to continue to allow the various manufacturer processes that have and will continue to provide this service to their respective customers.

EMA noted that engine manufacturers can (and do) provide the necessary parts and training for modification of products that are used in high-altitude conditions. Customers that operate equipment in high-altitude areas are well aware of the need for these modifications. In order for these provisions to be viable, EPA must allow a means for the manufacturer to provide these altitude kits to consumers (dealer network, distribution system, etc.). However, EMA believes that the owner's manual information should be limited to altitude effects that owners will understand. Specifically, the owner's manual should include information that would inform the consumer that engines operated at altitudes greater than the manufacturer prescribed minimum may require the engine/equipment to be modified in order to ensure proper operation. The owner's manual also should instruct the consumer to contact the engine manufacturer for further information. In addition, the information provided to the ultimate customer must identify the range of altitude the product is expected to operate in, the applicable engine specifics required to determine the appropriate altitude kit, and where the customer can either obtain the required kit or have the kit installed.

EMA commented on §1054.115(c) "What other requirements apply?" EMA commented that the reference to 40 CFR Part 1065.520 should clarify that the specified barometric pressure range of 94.0 to 103.325 kPa is an exception rather than an additional requirement. Further, EMA commented that the meaning of the reference to a "standard configuration" is unclear. Accordingly, the language should be revised to read as follows: "Engines must meet the applicable emission standards for valid tests conducted under the ambient conditions specified in 40 CFR Part 1065.520 except using a barometric pressure range from 94.0 to 103.325 kPa. This requirement is applicable to nonhandheld engines distributed to all areas that do not exceed 2000 feet in elevation above sea level. See §1054.145(c) for handheld engine provisions. For higher altitude distribution, and resulting lower barometric pressures, carburetor modifications by the use of altitude kits is acceptable provided that these kits are specified in the certification application and information is provided to the customer that identifies the altitude kit requirements."

EMA commented on §1054.501(b)(3) "How do I run a valid emission test?" EMA noted this section directs the manufacturer to perform testing under the ambient conditions specified in 40 CFR Part 1065.520, however, the ambient pressure range specified in §1065.520 is a range from 80.0-103.325 kPa and the pressure range specified in §1054.115(c) is 94.0-103.325 kPa. Therefore, EMA commented that §1054.501(b)(3) should be revised to reflect the pressure range applicable to Small SI engines pursuant to §1054.115(c) and the reference to §1065.520 should be deleted.

EMA commented on §1054.205(r) "What must I include in my application?" EMA commented that this section should be revised to clarify what information must be submitted in the certification application, and what information must be made available to consumers. Engine manufacturers routinely utilize engineering analysis to determine the altitude kit requirements which are correlated to engine function performance at different altitudes. However, the engine manufacturer does not have the ability to directly confirm emission compliance. EMA commented that this section should be revised so that it is clear that while the information provided to the engine owner must be accurate, it also should be easy to understand and not overly technical. Specifically, the information required to be provided to the engine owner should either enable the engine owner to determine whether or not an altitude kit is appropriate and necessary for their operating location or provide contact information for a resource that can assist with such determination.

Letters:

Commenter	Document #
OPEI	0675
EMA	0691

Our Response:

The altitude-related requirements appropriately specify that emission standards apply for nonhandheld engines throughout the range of atmospheric pressures identified in §1065.520, specifically from 80 to 103.325 kPa. We are adopting special testing and compliance provisions related to altitude. We are requiring that nonhandheld engines meet emission standards without an altitude kit, but will allow, in certain cases, testing at barometric pressures below 94.0 kPa (which is roughly equivalent to an elevation of 2,000 feet above sea level) using an altitude kit. (An altitude kit may be as simple as a single replacement part for the carburetor that allows a greater volumetric flow of air into the carburetor to make the engine operate as it would at low altitudes.) Such kits were allowed under part 90 and we are keeping the provisions that already apply in part 90 related to descriptions of these altitude kits in the application for certification. This includes a description of how engines comply with emission standards at varying atmospheric pressures, a description of the altitude kits, and the associated part numbers.
We agree that §1054.501 should reference the pressure-related provisions in §1054.115, but do not agree that the reference to §1065.520 should be deleted.

OPEI's comments generally supported the proposed standards and related requirements for complying with the regulations based on operation at high altitude. The requirement for nonhandheld engines to meet standards up to 94.0 kPa without an altitude kit and for manufacturers to specify the need for altitude kits to continue to comply with emission standards at lower pressures (or higher altitudes) fits with the recommendations spelled out in the comments. Also, EMA's description of an approach to including altitude-related information in the owner's manual is an excellent summary of what we would hope to see. The regulations are somewhat less descriptive than EMA describes, but we would have no objection if manufacturers include the additional information suggested in the comment.

We believe the proposed provisions requiring manufacturers to describe altitude-related information in the application for certification are clear. The regulations in §1054.205 specify simply that manufacturers must describe their plan for making information and parts available such that they would reasonably expect kits to be widely used in high-altitude areas. The example noted includes a very basic expectation that owners should have ready access to information describing when an altitude kit is needed and how to obtain this service. The detailed description included in EMA's comments would be a satisfactory approach to meet these requirements.

One thing engine manufacturers could consider adding in their communication to owners would be geographic-based information. For example, we identify in the regulation those counties with median altitudes greater than 4000 feet above sea level. Owner's manuals or websites could include specific information to identify those areas as needing altitude kits for proper engine operation, if applicable.

2.3 Averaging, banking, and trading

2.3.1 Use of Phase 2 credits (and early Phase 3 credits)

What Commenters Said:

EMA noted that the implementation of Phase 3 exhaust emission standards clearly will play an important role in the continued improvement of the environment. Early introduction of clean technology that would further benefit the environment should be encouraged, and manufacturers should be afforded meaningful incentives for the early introduction of these cleaner Phase 3 products. It is imperative that EPA recognize that the ability of manufacturers to comply with the Phase 3 program is tied to their ability to use existing Phase 2 credits and the creation of transitional and enduring Phase 3 credits from the early introduction of Phase 3 product. Engine manufacturers that have either provided a historical benefit or are eager to provide additional environmental benefit through either early compliance or the introduction of over achieving nonhandheld engines should be encouraged to do so. EMA recommended a number of changes to the NPRM in order to ensure the success of this important program. OPEI also recommended the same changes in their comments.

First, EMA and OPEI commented that the requirement that both Phase 3 transition credits and Phase 3 enduring credits must be used prior to using Phase 2 credits should be revised. Engines that are introduced early and produce Phase 3 enduring credits are providing a substantial environmental benefit that should be encouraged. As proposed, there is no incentive for manufacturers to certify engines to FEL levels below the Phase 3 standard level because EPA would require the resulting enduring credits to be used prior to Phase 2 credits. Said another way, one of the costs to the manufacturer in investing in engines certified below the Phase 3 level is the likely loss of Phase 2 credits. That is unfair, and makes no sense. As a practical matter, certifying below the Phase 3 level prior to expiration of Phase 2 credits would have no benefit to the manufacturer as currently proposed. Accordingly, in order to promote and encourage the early introduction of Phase 3 and over-achieving nonhandheld products into the marketplace as soon as possible, engine manufacturers must be allowed to preserve the Phase 3 enduring credits that they have the capability of generating (see §1054.740(c)).

Second, EMA and OPEI commented that at the present time, the proposed AB&T program creates substantial concern and potential exposure to engine manufacturers because of their inability, despite their intentions, to be able to plan for such unforeseen factors as weather and customer demand. When that uncertainty is coupled with the proposed combined limitations on the use of Phase 2 and Phase 3 credits, manufacturers' ability to ensure compliance is jeopardized. In order to prevent such unintended consequences, manufacturers should be allowed to utilize Phase 2 credit banks discounted by 20% per year or, in the alternative, if no Phase 2 credits exist, to carry a negative credit balance for up to two model years. The option for a manufacturer to maintain a negative credit balance would be at EPA's discretion, based on the manufacturer's ability to provide information demonstrating that any negative credit balances would be eliminated no later than the 2016 model year. In addition, EMA and OPEI envision that EPA would not allow a negative credit balance situation based on planned engine family FEL and volume projections, but only on unexpected volume adjustments occurring within an averaging set or the need to make an unanticipated upward adjustment to FEL due to an insufficient compliance margin, as determined from production line testing (see §1054.740).

Finally, EMA and OPEI commented that engine manufacturers which have provided a benefit to the environment through the early introduction of Phase 3 credit generating nonhandheld engines should not be penalized regarding the use of those credits for the continued certification of their handheld engine families. Handheld engine families will continue to comply with the same exhaust emission standards under the proposed Phase 3 standards as the current Phase 2 engine families. A requirement for these carry-over handheld engine families to utilize Phase 3 nonhandheld generated credits is inappropriate and should not be included in the final rule. OPEI commented that these specific handheld families should be allowed to continue to use Phase 2 credits under the provisions EPA has outlined.

CARB commented that in general it supports restrictions on credit generation and use to ensure that emissions benefits represented by the credits are accounted for properly. CARB commented that it would like to strongly discourage the concept of carrying an emission credit deficit. Manufacturers have sufficient time to plan for the change to new engines and they have the option to make the changes earlier than the deadline. If however, U.S. EPA chooses to allow the use of credit deficits, CARB would strongly encourage a stiff penalty to be added to the deficit as well as a set time limit as to the length of time the deficit may be carried.

CARB also commented that EPA should allow only Phase 3 nonhandheld engine credits to be used under the handheld engine credit provisions after 2013. They believe that prohibiting the use of Phase 2 nonhandheld engine credits for demonstrating compliance with the Phase 3 nonhandheld engine standards after 2013 is reasonable.

Letters:

Commenter	Document #
EMA	0691
OPEI	0675
CARB	0682

Our Response:

EPA believes ABT programs are an important element in setting emission standards that are appropriate under Clean Air Act section 213(a) with regard to technological feasibility, lead time, and cost, given the variety of engines covered by the small SI standards. Depending on their design, ABT programs can create an incentive for the early introduction of new technology, allowing certain engine families to act as trailblazers for new technology. This can help provide valuable information to manufacturers on the technology before they apply the technology throughout their product line. Early introduction of such engines can also secure earlier emission benefits. Thus, EPA believes it is beneficial to design ABT programs to encourage use of the ABT program, especially provisions that encourage the early introduction of new technologies.

EPA agrees that the proposed provisions requiring manufacturers to use their enduring Phase 3 credits before being allowed to use their Phase 2 credits allowance does not encourage the early introduction of Phase 3 engines during the Phase 2 timeframe. In order to encourage the introduction of Phase 3 compliant engines prior to implementation of the Phase 3 standards, EPA is eliminating the proposed provision that would require a manufacturer to use their enduring Phase 3 credits before using their Phase 2 credit allowance. Therefore, under the Phase 3 ABT program, engine manufacturers will be required to use their Phase 3 transitional credits first. If their Phase 3 transitional credit pool is not sufficient, the manufacturer will be able to use their Phase 2 credit allowance second. Should that still not be sufficient, then the manufacturer will be allowed to use their Phase 3 enduring credits last of all to demonstrate compliance.

With regard to the comments on credit deficits, EPA does not believe such provisions are necessary for the Phase 3 program. Given the amount of lead time before the new standards are scheduled to take effect and the provisions allowing use of limited Phase 2 credits, EPA believes manufacturers should be able to monitor their production levels and establish conservative FEL values (especially during the introduction of new engine families) to avoid situations where a deficit situation occurs. While EPA understands that manufacturers could find themselves in a situation where sales volume adjustments occur within an averaging set or an FEL needs to adjusted upward, EPA believes that such changes should be relatively small and within the manufacturers control to a great degree. Manufacturers participating in the ABT program would need to take these potential outcomes into consideration when making plans for complying with the Phase 3 standards through the use of the ABT program.

Finally, in response to the comments on requiring manufacturers to use only Phase 3 nonhandheld credits for handheld engines, EPA is not adopting such a requirement in the final rule. Under the Phase 3 program, in which we are not changing the Phase 2 exhaust standards for handheld engines, manufacturers of handheld engines will be allowed to use credits from

Phase 2 handheld engines for their Phase 3 handheld engines without any restriction. Therefore, EPA believes it can allow manufacturers to use Phase 2 credits from nonhandheld engines to offset their high-emitting handheld engines under the constraints specified in the rule. (As noted in Section 2.3.2, EPA is adding an annual sales limit of 30,000 handheld engines for which a manufacturer can use nonhandheld engine credits.)

2.3.2 Averaging sets and other restrictions

What Commenters Said:

EMA commented that the restrictions regarding cross-class trading of credits is appropriate during the introductory period when unrestricted trading could effect standard implementation, use of Phase 2 credits, and other factors. However, those restrictions should be removed beginning with the 2013 model year. Therefore, EPA should clarify that there are no restrictions for nonhandheld credit trading beginning with the 2013 model year (see §1054.740(d)).

Honda commented that EPA should allow averaging, banking and trading (ABT) of credits across all engine categories, including handheld and nonhandheld engines. The proposed rule uses a stepped form of dividing engines and their respective emission levels into three categories, 0 to 80cc, 80 to 225cc, and above 225cc, and allows averaging and banking only within these separate categories. The inability to average and bank credits inherently applies more significant technical and economic challenges for engines of smaller displacements, within their class, to comply with the specific standard. The ability to supply engines in all displacement and horsepower categories is enhanced by the ability to “smooth” through averaging, exhaust standard steps in a way that resembles the feasible horsepower/displacement curve function. Honda understands that the proposed rule limits the use of existing Phase 2 credits in order to “pull-ahead” the effective implementation of the regulatory standards. However, Honda believes that treatment of Phase 3 credits, including early Phase 3 credits, should be independent of the Phase 2 credits and commented that EPA should consider allowing averaging, banking and trading across Phase 3 categories, in the same manner allowed in Phase 2.

Honda commented that EPA should clarify in the final rule when and if an engine less than 80cc would be categorized as nonhandheld for ABT purposes if EPA does not allow Phase 3 cross class averaging. Clarification or added guidance in the final rule would be useful where an engine less than 80cc is used in a nonhandheld product would qualify as nonhandheld for purposes of ABT, such as an engine used in a ground-supported mini-tiller.

Letters:

Commenter	Document #
EMA	0691
Honda	0705

Our Response:

With regard to the comment on cross-class trading of nonhandheld credits within the nonhandheld engine classes, EPA proposed to allow such trading starting in model year 2013. EPA has added language to specifically state that this is allowed in §1054.740 of the regulations.

EPA believes the proposed restrictions on credit exchanges between handheld and nonhandheld engines in the Phase 3 ABT program should be retained in the final rule (with the limited exception as noted below). While EPA is adopting more stringent exhaust standards for nonhandheld engines in this rule, EPA is not revising the Phase 2 exhaust standards for handheld engines. While most manufacturers tend to be in either the handheld engine market or the nonhandheld engine market, there are a few manufacturers that have a mix of engines falling into both categories. Under the Phase 2 program, where EPA allowed unrestricted averaging across both handheld and nonhandheld engine categories, some manufacturers were able to use credits from one category to delay introduction of cleaner technology engines in the other category. This gave these manufacturers a potential advantage in the market compared to other engine manufacturers that implemented the new technologies and did not have the ability to average with engines in the other category. EPA does not believe an ABT program should encourage such situations in the market. For this reason, EPA is retaining the averaging set restrictions for the Phase 3 rule which prevents averaging of emissions between handheld and nonhandheld engines (except as noted below).

EPA is adopting the proposed provisions which allow manufacturers to use nonhandheld engine credits for handheld engines if the engine family was certified in 2008 based on carryover emissions data and the FEL does not increase above the level selected for the 2007 model year. Based on current certification data, only a small number of engine manufacturers would be impacted by these provisions and the number of handheld engines potentially affected is very small, with overall sales being less than 1 percent of handheld engine sales. However, because of concerns that manufacturers could increase their sales of such high FEL handheld engines, EPA is adopting one additional constraint. Under the final regulations, manufacturers may use nonhandheld credits for up to 30,000 handheld engines per year. EPA believes that the constraints being adopted regarding the use of nonhandheld engine credits for handheld engines should ensure that the sales of these handheld engines remain at their currently low levels.

In regard to the comments on which engines certified to the handheld engine standards can generate nonhandheld engine credits, EPA proposed to allow manufacturers to generate nonhandheld ABT credits from engines below 80cc for those engines a manufacturer has determined are used in nonhandheld applications. EPA is retaining that provision in the final rule. Therefore, a manufacturer can generate nonhandheld engine credits from engines at or below 80cc that are subject to the handheld engine standards if the manufacturer determines they are used in nonhandheld applications (i.e., applications that do not meet the handheld definition in §1054.801 of the regulations). Because the engines are subject to the handheld engine standards, the credits would be generated against the applicable handheld engine standard. These nonhandheld credits could be used within the Class I and Class II engine classes to demonstrate compliance with the Phase 3 exhaust standards, subject to applicable restrictions. Given the restriction on mixing credits between handheld and nonhandheld engines, credits generated by engines at or below 80cc used in handheld applications could only be used for handheld engines.

2.3.3 FEL caps

What Commenters Said:

EMA supported the proposal that FEL caps should be established at the Phase 2 standard levels. EMA commented that the engine families previously considered Class I-B under the Phase 2 regulation and that are set to become Class I engines under the proposal must be allowed to utilize the prior Class I-B standard level at the FEL cap as those engines were not subject to the Phase 2 Class I standard levels.

Letters:

Commenter	Document #
EMA	0691

Our Response:

EPA agrees with the comment that FEL caps should be established at the Phase 2 standard levels. The final rule includes such a requirement in §1054.103(b) by stating that a manufacturer may not specify a family emission limit that exceeds the applicable Phase 2 standards as specified in 40 CFR 90.103 and summarized in Appendix I of Part 1054.

2.3.4 Credit life

What Commenters Said:

Both EMA and OPEI commented that they oppose the proposition that any engine-exhaust or evaporative credits generated by a manufacturer should have an arbitrary life period. Emission credits are either generated through the voluntary early implementation of new emission control technology or introduction of products that are cleaner than required by the applicable emission standard. Such credits are generated at a cost to the manufacturer, and are granted in exchange for the manufacturer's independent decision to produce products that provide additional benefits to the environment. These credits are important assets that should not be arbitrarily lost due to time or actions not under the manufacturer's control.

CARB commented that it strongly urges EPA to limit the credit life of exhaust credits earned to five years. They commented that emission credits should not outlast the equipment which allowed the manufacturer to attain the credits. CARB also commented that a five year limit on the credit lifetime would also be consistent with the proposed useful life requirements under which the engine manufacturers would be required to warrant the engine for five years.

Briggs & Stratton commented that it opposes any limitation on the life of ABT credits. Engine manufacturers should not be punished for not using the credits in an arbitrary time frame. Briggs and Stratton also commented that the proposed ABT provisions almost completely eliminate the Phase 2 emission credits that have been generated by small engine manufacturers. Engine manufacturers in good faith generated Phase 2 credits under the current regulations. The proposal by EPA is a significant loss to the engine manufacturers.

Letters:

Commenter	Document #
OPEI	0675
EMA	0691
CARB	0682
Briggs and Stratton	0657

Our Response:

We are retaining the unlimited lifetime for Phase 3 ABT credits, as proposed. While EPA is retaining the unlimited lifetime, EPA notes that manufacturers should not assume that Phase 3 credits will be available without any restrictions on their use if, and when, EPA should consider a new round of emission standards in the future. In setting new emission standards, section 213(a) requires of the CAA requires EPA to set emission standards that achieve the greatest degree of emission reduction achievable through the application of technology which EPA determines will be available for the engines or vehicles to which such standards apply, giving appropriate consideration to the cost of applying such technology within the period of time available to manufacturers and to noise, energy, and safety factors associated with the application of such technology. If manufacturers have a large pool of ABT credits available to them, EPA must consider ways to ensure that those credits do not result in an unnecessary delay of the standards. This can be done in a variety of ways, and has been done in the Phase 3 final rule by allowing only limited numbers of Phase 2 credits to be used for a limited period of time during the transition to the new Phase 3 standards.

EPA does not believe a limit on the life of Phase 3 credits is needed at this time for the ABT program adopted with today's program. Phase 3 credits will be generated at a cost to manufacturers and thus they will have a value to the manufacturers. EPA believes provisions which limit a manufacturer's ability to use credits during the Phase 3 timeframe, such as a limit on credit life, will reduce the incentive for manufacturers to invest in the development and introduction of new technology. However, as mentioned above, manufacturers should not assume that an unlimited life for Phase 3 credits means those credits will be available without any restrictions on their use if, and when, EPA should consider a new round of emission standards in the future. As part of any future rulemaking, EPA would expect to consider ways to ensure that the Phase3 credits existing at that time would not result in an unnecessary delay of any future standards.

With regard to the comment on the loss of Phase 2 credits, EPA does not believe manufacturers have a right to use those credits indefinitely. In fact, EPA would like to point out that such a scenario was clearly a possibility and was noted in the Summary and Analysis of

Comments document for the Phase 2 nonhandheld rule. ("Summary and Analysis of Comments, Phase 2 Emission Standards for New Nonroad Spark-Ignition Nonhandheld Engines At or Below 19 kW," March 3, 1999, docket item EPA-HQ-OAR-2004-0008-____.) In response to comments on the unlimited lifetime of Phase 2 ABT credits, EPA stated that while it was adopting an unlimited credit lifetime for Phase 2 ABT credits at the time, EPA did not wish to limit its ability to address possible unforeseen conditions that arise as a result of the program in future rulemakings. EPA further stated that it would be able to reconsider the appropriate life of Phase 2 ABT credits in connection with any post-Phase 2 rulemaking.

2.3.5 Other ABT Issues

What Commenters Said:

EMA submitted a number of comments on specific regulatory sections. EMA commented on §1054.105(b) "What exhaust emissions standards must my non-handheld engines meet?" EMA noted that while the proposed AB&T program is restricted to HC+NOx emissions, the NPRM does not expressly state that CO emission standards cannot use AB&T (as previously included in Part 90.201). Because the proposal includes a compliance requirement with the significantly lower CO standard for marine generator engines, EMA commented that the final rule should clarify that AB&T is not applicable to CO emissions.

EMA commented on §1054.715(b) "How do I bank emission credits?" They commented that reserve credits cannot be traded. Therefore, EMA recommends that the reference to "trading" should be deleted from this section. (Also included in Section 4.4.5)

EMA commented on §1054.725(b)(2) "What must I include in my application for certification?" They commented that engine families that generate or use credits at the time of certification should not be required to designate their credit destination or origin within the averaging set. (Also included in Section 4.4.5)

EMA commented on §1054.730(f)(3) "What ABT reports must I send to EPA?" EMA commented that if an error mistakenly increases a manufacturer's balance of emission credits, correction of the errors and recalculation of the balance of emission credits should be undertaken at the manufacturer's discretion. They manufacturer should not be required to correct the errors and recalculate the balance of emission credits as currently proposed. (Also included in Section 4.4.5)

EMA commented on §1054.735(d) "What records must I keep?" EMA commented that the requirement to keep additional records for each engine or piece of equipment including the engine identification number, build date and assembly plant is excessive and beyond the current requirements of 40 CFR Part 90.209. They commented that these additional record keeping requirements either should be deleted or replaced with engine manufacturer records associated with products produced. (Also included in Section 4.4.5)

EMA commented on §1054.735(e) "What records must I keep?" EMA commented that this section appears to be arbitrary and capricious. EPA should not be allowed to require manufacturers to keep additional unspecified records or demand additional information not required by the rule without a proper purpose or for cause. EPA should be required to support any imposition of additional record keeping requirements or demand for additional information with specific and appropriate reasons. Further, such decisions should not be made unilaterally by EPA, and the manufacturer must have the ability to question any such request and, if necessary, request a formal hearing process. (Also included in Section 4.4.5)

EMA commented on §1054.625(j)(2) "What requirements apply under the Transition Program for Equipment Manufacturers?" EMA commented that the requirement to multiply credits generated by an engine family by 0.9 must be limited to engine families that are actually utilized by equipment manufacturers under the §1054.625 flexibility provisions. In addition, EMA commented that engine manufacturers should have the option to track the correct number of engines that utilize the §1054.625 flexibility provisions and adjust ABT credit calculations based on the actual number of engines.

OPEI commented that the "flex" provisions will not be implemented if excessive regulatory burdens discourage engine manufacturers from participating in that program. OPEI believes an unintended possible outcome of the proposed ABT credit adjustment program is the creation of a disincentive for engine manufacturers to participate in the flexibility program. Such a credit adjustment requirement would be unfair (in terms of lost, banked, credits) and would also be overly burdensome to administer. To OPEI's knowledge, such ABT credit adjustments are not part of EPA's other similar equipment flexibility programs. If such an adjustment program is required, OPEI recommended that the credit adjustment provisions for Delegated Assembly be clearly defined as applicable only to those discrete engine families that utilize the Delegated Assembly provisions and are also participating in the flexibility program pursuant to Section 1054.625(c)(2). There are many circumstances where no Delegated Assembly engines will be utilized for equipment manufacturer flexibility programs and discounting of credits should not occur under any scenario. If a credit adjustment program is required, engine manufacturers must be given the option to participate in the flexibility program pursuant to §1054.625(c)(2).

Letters:

Commenter	Document #
EMA	0691
OPEI	0675

Our Response:

With regard to the comment on CO, the ABT program for small SI engines does not cover CO emissions. EPA agrees that language stating that CO is not part of the ABT program should be included in the Part 1054 regulations. EPA has revised §1054.103 and §1054.105 to include such language.

EPA disagrees with the comment on §1054.715(b) suggesting that reserved credits cannot be traded. The existing Phase 2 ABT regulations in 90.206(b), allow manufacturers to trade current model year credits. Current model year credits are "reserved" credits by definition, because manufacturers do not submit their end-of-year and final reports until after the model year is finished. Therefore, EPA believes it is appropriate to include similar language in the Phase 3 ABT regulations stating that reserved credits can be traded. Therefore, §1054.720 of the regulations states in paragraph (b) that a manufacturer may trade reserved emission credits.

Also, it should be noted that the language of §1054.715, paragraph (b) which was noted by the commenter in their comments has been changed to fix an inconsistency in the regulations. The proposed language stated that a manufacturer's credit projections submitted at the time of certification were considered "reserved credits." This is not the case as "reserved credits" are defined in §1054.701 as credits that have been generated, but not yet verified by EPA. In order to generate credits, the manufacturer must actually build engines, not just project that they will build engines. However, the revised language of 1054.715(b) also allows reserved credits to be traded.

EPA agrees with the comment on §1054.725(b)(2) suggesting that manufacturers not have to designate the credit destination or origin for each of its engine families and has removed that requirement from the regulations. However, for engine families that are projecting to use emission credits (i.e., the engine family has a negative credit balance), EPA believes that a manufacturer should provide information on where they will obtain credits for that engine family. Therefore, at the time of applying for certification, a manufacturer will be required to submit certain information to EPA. For the Phase 3 ABT program, the regulations require manufacturers to provide the FEL for the engine family, and detailed credit calculations for the engine family, as well as where they will obtain credits for their credit using families (i.e., from banked credits, from averaging with other current engine families certified with FELs below the standard, or from trading with other engine manufacturers). EPA does not believe it is necessary to require manufacturers to provide any further information, including a detailed accounting of where they plan to use their credits or if the credits they plan to use are actual or reserved, as proposed.

EPA disagrees with the comment on §1054.730(f)(3) suggesting that a manufacturer be allowed to fix errors in the credit reports at its discretion. If errors are discovered at any time showing that a manufacturer has earned too many credits, then EPA believes a manufacturer should be required to correct the error. The ABT program is meant to ensure that the average emission level of all participating engines meet the applicable standard. An error in the ABT reporting that results in more credits being generated than should be generated could result in the average emission level being above the emission standard even though the original credit calculations did not show such a result. Requiring manufacturers to fix such errors would allow EPA to then address any resulting noncompliance.

In response to the comment on §1054.735(d) that the information a manufacturer is required to keep for ABT is excessive, EPA is making some changes to the regulations. EPA believes the changes will still allow us to have access to important information if needed, especially if a noncompliance situation arises. Under §1054.730 of the final regulations, paragraph (b) requires manufacturers to report a variety of information for engines participating in the ABT program including family designation, FEL, useful life, and the production volumes for each participating family. Under §1054.735, manufacturers will be required to keep a copy of the reports submitted to EPA under §1054.730 along with a record of the identification number for each engine produced. If there are multiple FELs in an engine family, the manufacturer will need to keep records of the identification number associated with each FEL. Manufacturers may identify these numbers as a range. Manufacturers will not be required to list the build date for each engine produced, nor will they be required to keep information on the assembly plant as originally proposed.

With regard to the comment on §1054.735(e) on the provisions requiring manufacturers to keep or allowing EPA to request additional unspecified records or relevant information, EPA believes such a requirement is allowable and necessary. Section 208 of the Clean Air Act (which applies to nonroad engines under section 213(d) of the Clean Air Act) describes the information collection requirements for manufacturers. Under those requirements, manufacturers must provide information EPA may reasonably require to determine whether manufacturers have acted in compliance with regulations. While EPA has listed the specific information a manufacturer must keep for the Phase 3 ABT program in §1054.735, it is possible in the future that we may identify other information that would be needed to deal with a specific situation. The provisions in paragraph (e) of §1054.735 would allow us to request such information. Of course, EPA would only request such additional information if it were in accordance with the law, such as provided for in section 208 of Clean Air Act. In addition, EPA would only expect manufacturers to keep and provide such information after we have put such a request into effect, either through a rulemaking change or guidance to manufacturers. In response to the comment, EPA has revised the language of §1054.735 paragraph (e) to reflect that EPA will request information if it is in accordance with the law. Finally, in response to the comment on requesting a hearing if a manufacturer believes EPA's request is inappropriate, the proposed regulations allow a manufacturer to request a hearing from EPA under §1054.745, paragraphs (c) and (d). EPA has retained those requirements in the final regulations.

In regard to the comments on §1054.625(j)(2) on adjusting ABT credits for credit-generating engine families that are available under the delegated-assembly provisions, EPA continues to believe it is appropriate to adjust such credits. Rather than imposing a disincentive from participating in the transition program for equipment manufacturers (TPEM) program, the credit adjustment merely accounts for the fact that equipment manufacturers may in many cases legally install a non-catalyzed muffler on an engine that is part of a family whose certification depends on the use of a catalyst. It is true the EPA has not adopted this adjustment for other engine categories, but this is because most other engine categories do not have a TPEM program and none of them allow engine manufacturers to produce these engines without specifically identifying them as exempt TPEM engines. EPA wishes to clarify that the adjustment applies only to engine families that are available under the delegated assembly provision and are also participating in the TPEM program. As noted in the proposal, the proposed credit adjustment factor of 0.9 is intended to represent the maximum estimated usage of the TPEM program across the broad range of equipment manufacturers. However, EPA understands engine manufacturers' concerns that the adjustment may not reflect the actual number of engines that are downgraded for use in the TPEM program. Therefore, for the final rule, EPA is retaining the 0.9 adjustment factor. In addition, EPA is including an option that will allow engine manufacturers to track the final configuration of the engines to determine the actual number of engines that were downgraded for the TPEM program. A manufacturer would need to track sales for <u>all</u> of the equipment manufacturers purchasing the given engine family. The engine manufacturer could use the resulting number of engines that were not downgraded in its calculation of ABT credits for that specific engine family.

2.4 Certification

2.4.1 Changing the FEL mid-year (and printing FELs on labels)

What Commenters Said:

OPEI and EMA disagreed with EPA's negative assessment of FEL changes made during the model year. Currently, engine manufacturers may set their initial FEL levels to a level that they are confident will pass production audits and will not result in compliance concerns (provided compliance with the standard requirements is achieved). If, based on the actual production audit results and subsequent Cum-Sum analysis, the manufacturer determines that the FEL could have been lower from the beginning of the model year (or implementation of a running change), OPEI commented that the manufacturer should be allowed to claim credit for the environmental benefit actually provided. The ability to correct the FEL level also provides the manufacturer with a limited ability to recoup credits under the EPA program that are otherwise available to manufacturers under CARB's PLT credit program.

OPEI agreed that lowering the FEL should have a limit. A manufacturer that has already submitted production line test data for a family should not be allowed to retroactively (even at a point in the 4th quarter that would apply back to the first quarter) lower the FEL later in the model year to a level that would result in a CUM-SUM failure from earlier tests in the model year. This in effect sets a cap on the FEL change.

OPEI and EMA commented that the proposed rule's requirement to include the FEL numerical reference on the engine emission label would prevent the manufacturer from being able to accurately represent (in the CARB PLT credit case) or retroactively change FEL levels. They commented that the final regulation should provide the engine manufacturer the ability to make retroactive FEL adjustments. Also, in order to allow such adjustments, OPEI and EMA believe it is essential that EPA drop the proposed FEL labeling requirement.

OPEI noted that CARB does not require either exhaust or evaporative family emission levels (FELs) to be placed on the emission label. EPA's proposal to add individual evaporative and exhaust family emission levels (FELs) on the label would be inconsistent with CARB, would further confuse consumers, and would be totally impractical for manufacturers. For example, consumers could end up unintentionally buying a product with more horsepower that emitted greater mass emissions because the consumer did not realize the FELs are normalized to a single kilowatt. Such FEL labeling will also facilitate additional local purchase restrictions and use bans in direct violation of Section 209(e) of the Clean Air Act and the related legal precedent on federal pre-emption (as discussed below in Section XIV). For all these reasons, OPEI commented that EPA should drop completely its proposed exhaust and evaporative FEL labeling requirement. (Comment also included in 4.6.1 and 4.6.3)

EMA commented on §1054.701(e) "General provisions." EMA believes the requirement that an FEL can only be adjusted applicable to future production is not appropriate and should be deleted. For example, if a manufacturer determines, based on PLT test results, that the margin for compliance is inadequate and that credits exist either from the current model year or prior model year banked credits, it should be allowed to increase the FEL for the entire model year.

With regard to FEL changes, CARB commented that it agrees with EPA that any revisions to the FEL should only apply to engines produced after the FEL change. They agree that it would be difficult to test the engines before the FEL change because verifying the engine emissions from previously produced engines would be difficult.

Briggs and Stratton noted that EPA asked for comments on including the FEL on the emission labels. Briggs & Stratton disagrees with this proposal. The addition of the FEL on emission labels provides no benefit to consumers, EPA, or the environment. However, this proposal does impose a significant burden on both the engine manufacturer and the OEM. They noted that supplemental labels are required for many applications where the emission label is obscured in the final product. If the FEL must be printed on the emissions label a new emission label is required whenever the FEL is changed. This creates more costs and labels to manage for the engine manufacturer and the equipment manufacturer with no commensurate benefit to the environment. Briggs and Stratton commented that EPA should delete the requirement for the FEL to be printed on the label.

Letters:

Commenter	Document #
OPEI	0675
CARB	0682
Briggs and Stratton	0657
EMA	0691

Our Response:

We maintain two principles that contradict the manufacturers' comments regarding FEL changes and printing FELs on emission labels. First, we believe that each engine a manufacturer produces should be associated with a family emission limit at the point of production. This is important for ensuring proper accountability and enforceability. If manufacturers are able to assign FELs after production with the only restriction being related to compliance with statistical calculations for production-line testing, there is a great concern that it would be very difficult to confirm that FELs were assigned appropriately. Similarly, if accountants change FELs retroactively, it would be very difficult to test engines after they have been placed into service and establish whether it meets emission standards or not. There would seem to be no clear way of knowing which FEL applied to which engine.

Second, the intent of production-line testing and the underlying statistical calculations depend on the engine having a specific and permanent applicable standard (with or without an FEL). The statistical calculations are based on a given number of engines passing or failing the applicable emission standard out of a bigger population representing the complete emission family. Repeating the CumSum calculations after the end of the year has the effect of simulating the engine family as if the tested engines were the complete population. Aside from the bad math, we believe manufacturers should set their FELs with the understanding that they are liable for the test results as they are generated. Waiting until the end of the year to set the real and final FEL sets up an incentive for the manufacturer to use a high FEL through the year, then simply reduce the FEL at the end of the year as much as the statistics allow. This puts the manufacturer in a position of having almost no liability from production-line testing. In contrast, we believe manufacturers should set the FEL for a family only as low as they can based on the understanding that tested emissions must comply with the named FEL. If manufacturers learn early in the model year that their FEL is higher than it needs to be, they may decrease the FEL as much as can be justified based on prior testing and use that lower FEL for most of the model year to generate larger quantities of credits (or use smaller quantities).

We proposed to require manufacturers to print FELs on emission labels. This is common across our programs and is intended to help us clearly establish the applicable emission standard for each engine. In discussions after the close of the comment period, manufacturers agreed with us that it would be as effective for the manufacturers instead to keep records to correlate engine build dates with changing FELs. For example, if a manufacturer would change the FEL for an engine family for production engines starting June 14 of a given year, it would keep a record of engine identification numbers that would allow them to identify the applicable standard for each engine. If manufacturers choose to identify their build dates by month and year (without the specific date), the presumed build dates would default to least favorable dates for the manufacturer. In the case of an FEL increase on June 14, this means the manufacturer would apply the new FEL starting with engines produced on June 1; conversely, a decreased FEL would apply starting with engines produced on June 30. This flexible approach would allow the manufacturer to forego some emission credits for the advantage of being less careful with tracking engine serial numbers with build dates. This approach for assigning dates for calculating emission credits may be slightly different than the timing associated with the revised certificate that we would issue for the engine family; however, we believe this should not be a problem.

Along with the requirement to keep records of engine build dates with FEL changes, we are adopting a requirement for the manufacturer to report this information in the ABT reports submitted after the end of the model. These engine identification numbers may be submitted as a range of values to streamline the report as much as possible.

2.4.2 Useful life implementation (and labeling)

What Commenters Said:

CARB commented that it agrees with U.S. EPA that a numerical value is the best way to describe the useful life of equipment. If other terminology is used, CARB suggests that both the descriptive terminology and the numerical value should be used. If only one can be used, then CARB suggests that the numerical value representing the useful life be retained.

NESCAUM commented that it supports EPA's proposal to require engines and equipment be labeled in a manner that will help the user better understand the intended useful life of the equipment. They believe using descriptors such as Residential, Premium Residential, Commercial, and Heavy Commercial will be helpful in this regard, provided that there is a means to match the descriptor against a specified useful life period in terms of operating hours or years.

OPEI commented that it is concerned that a consumer may become confused if only the hours are listed on the label. A 125-hr handheld product is considered “Premium Residential” according to EPA while a 125-hour Class I engine would be classified as “Residential”. To avoid this confusion OPEI requested the EPA allow for the use of hours, or the use of descriptive terms (Light Use, Medium Use, Heavy Use), or the use of both hours and descriptive terms on the label. OPEI agrees that Class I and Class II engines and their applications require different terms of usage.

OPEI requested that a handheld product manufacturer would have the choice of using any of these three options to describe the Useful Life period. OPEI supports the use of the terms “Light Use”, “Medium Use”, and “Heavy Use” to characterize the three useful life categories applicable to handheld engines instead of the terms EPA has proposed. OPEI believes their proposed terms best meet EPA’s objective of accurately describing the intended use to the purchaser. It is possible that a commercial operator may buy a product with a lower useful life but the usage pattern of the product would fit the description of the useful life. The integrated nature of handheld products allows a more transparent understanding of the durability of the product through marketing and other means.

OPEI noted that §1054.107(a)(4) deals with keeping information available to support Useful life selection. In addition, OPEI noted that page 88 of the Preamble states EPA intention to review Useful-life selection if not highest value. By default, if a manufacturer certifies to highest value, they are showing through cert testing that the engine meets the useful life period. OPEI commented that EPA should add language in §1054.107(a)(4) to confirm that EPA will approve the manufacturer’s useful life selection without further demonstration if the manufacturer selects the highest available useful life value and submits data showing that the engine lasted that long as part of the durability demonstration for certification.

OPEI notes that §1054.107(a)(4)(i) life time surveys are a point of interest for most manufacturers; “If a manufacturer has data to support an engine/product has the majority of its family sales sold to a market (for example homeowner use) then the manufacturer may certify the product/engine to an appropriate useful life provided the data supports that majority of the product built and sold does not exceed the actual usage time.” OPEI commented that if a manufacturer has a family where 70% of sales can be proven to be to homeowners and you can prove that a large majority, for example greater than 75%, of those homeowners will never use the product more than 125 hours before scrapping it, the manufacturer should be allowed to certify it to 125 hours even if the engine can be demonstrated to last longer.

EMA commented that it is critical that EPA recognize an engine’s useful life period, as determined by the engine manufacturer prior to certification and production, does not dictate the ultimate equipment manufacturer or ultimate consumer’s usage of the engine. There are a significant number of engines produced in this product category that will never be used for the prescribed emission durability period regardless of the years of use. There are also a very small number of engines in this category that will accumulate hours at a much faster rate, and depending on the equipment design, may be replaced prior to the expiration of the emission durability period. In many cases this usage disparity exists within a single given engine family.

EMA commented that EPA's criteria for acceptance of useful life must be expressly established and documented in order to assure consistent treatment and a level playing field. A manufacturer's decision to select the longest useful life period should require the same justification as other useful life period selection. The criteria used to approve emission durability periods must clearly be identified in the regulatory text or preamble language. Manufacturers must receive guidance from EPA regarding what types of records EPA expects to review in the event it asks a manufacturer to substantiate its selection of an engine's durability period. In addition, EMA commented that the final rule should expressly acknowledge that industry survey information regarding product categories usage patterns, such as previous OPEI surveys, is acceptable documentation of a manufacturer's useful life selection.

EMA commented on the proposed statement required by §1054.135(c)(4) "How must I label and identify the engines I produce?" EMA objects to the statement and commented that the manufacturer should have the option to include language associated with the emission durability period in the compliance statement. Accordingly, there should be a reference to §1054.135(c)(12) in this section.

Letters:

Commenter	Document #
OPEI	0675
NESCAUM	0641
CARB	0682
EMA	0691

Our Response:

This is the only program in which we allow manufacturers the discretion to select an engine family's useful life. We believe this is a necessary accommodation for the reality that similar engines can be designed and used for widely varying purposes, users, and applications. Making this selection is nevertheless fundamental to defining the stringency of the standards that apply to the engine family so we strongly believe we should set up clear, objective, and practical guidelines for choosing an appropriate useful life in each case. We should also have a role of monitoring compliance with these guidelines and intervening in cases where a manufacturer is misusing the available discretion to assign an inappropriately short useful life. We have observed several cases under the Phase 2 program where manufacturers select the shortest available useful life for an engine family where the engines are clearly designed and marketed as long-life products for commercial applications. In contrast, some manufacturers have chosen a mix of useful-life values that seems to appropriately match the varying design parameters and intended usage patterns. Our intent is to create a program in which we can ensure that all companies are together taking this approach of responsibly pairing useful life with the expected in-use operating life.

As described in the proposed rule, we believe emission labels need to clearly state the manufacturer's selected value for the useful-life period, in hours. Under the regulation, manufacturers are directed to select the useful life that most closely correlates with the equipment's expected lifetime of service. We believe this decision is important not only for emission controls, certification, and compliance but also for consumers. If a manufacturer puts in additional engineering and product features such that an engine can operate twice as long as a competitor's engine while meeting emission standards throughout the longer useful-life period, that should be clearly identifiable to the consumer as a superior product. The current approach of identifying the useful life with a single-letter code does not communicate useful-life information clearly enough. Similarly, we believe that descriptive terms may be helpful in communicating useful-life information, but they cannot replace the objective value of identifying useful life with a universal and clearly understood metric. Including the engine operating hours to identify the useful life is the best way to achieve this.

We believe it may also be helpful to add descriptive terms to further characterize an engine's useful life. We will therefore allow manufacturers the option of using prescribed wording in addition to identifying the hour value for the useful life. We are adopting the terms described in the proposal for nonhandheld engines. We believe these terms are well matched to the range of uses for nonhandheld applications. We have no objection to the wording suggested for handheld engines. Using different terms may be helpful to avoid any confusion that may result from attaching the same descriptive terms to different useful-life values for handheld and nonhandheld engines.

Application	Useful Life (hours)	Descriptive Terms
Handheld	50	Light use
	125	Medium use
	300	Heavy use
Nonhandheld Class I	125	Residential
	250	Extended life residential (or general purpose)
	500	Commercial
	>500	Heavy commercial
Nonhandheld Class II	250	Residential
	500	Extended life residential (or general purpose)
	1000	Commercial
	>1000	Heavy commercial

We agree with EMA that the criteria for establishing an engine family's useful life should be clearly defined and evenly applied for certifying engines. We also agree that the selected value should not prevent equipment manufacturers from installing engines according to the their own judgments about which engine is best suited to their particular equipment models, and that owners should not be restricted in how (or how long) they use their engines or equipment. Information about how equipment manufacturers and owners are selecting, installing, and using engines may factor into the engine manufacturer's decision regarding useful life, but once the engine family has a useful life, that value should not be limiting for equipment manufacturers or owners.

The regulation text we proposed and are adopting in §1054.107 is changed very little from the current regulation in §90.105, which was adopted in 1999. As described above, many engine manufacturers have been taking a responsible approach in exercising their discretion to select useful-life values. We therefore believe that the proposed regulation, with a few minor modifications, suitably defines the process for defining the terms and criteria for selecting useful life. Fundamentally, the regulations require that manufacturers select the useful life value that best represents the expected median in-use life of the equipment in which the engine will be installed, including specification of a variety of information types for supporting the selection. We do not expect a dramatic change from current practice for those manufacturers that are already making a good-faith effort to make proper selections. Making the effort to document the basis for making these selections, which is already required under §90.105, and subjecting those decisions to EPA review will ensure that all manufacturers receive equal treatment under the regulations. This will be a substantial improvement over the Phase 2 program where manufacturers may find themselves at a competitive disadvantage by making responsible useful-life selections.

While we believe the regulation is sufficiently clear in establishing the meaning of useful life and the process for making selections, we agree that further guidance will be helpful in taking the next step of making concrete decisions about which useful-life value most appropriately represents a particular engine family. This will give manufacturers assurance that useful-life selections will be made consistently across the industry, and will further help to ensure an orderly process for certification.

We agree with OPEI that engine manufacturers selecting the longest nominal value would not need to do any more than submit certification data showing that an engine representing the engine family operated long enough to appropriately establish deterioration factors. If there were any reason for a manufacturer to select a useful life that is too long (such as artificially generating credits from an engine family with a low family emission limit), we would see that under the Phase 2 program where we have not asked manufacturers to justify their selections. We have observed no such abuse under the Phase 2 program, so we have no reason to believe that would occur in the future. With no potential to require manufacturers to select a longer useful life, we therefore believe it is unnecessary for manufacturers to provide any additional information to justify their selection of the longest available nominal value for the useful life.

The regulation allows manufacturers to rely on product-specific surveys to establish the median life span of equipment in the field. It would not be appropriate to rely on broader surveys that characterize usage patterns or lifetimes for aggregated products, since that would provide no information that would demonstrate any greater reliability or durability that may apply for any particular engine family. It would not be appropriate to use industry averages to justify lifetime estimates for individual models. On the other hand, if a manufacturer has two engines with similar designs and technical features (such as one- and two-cylinder versions of an otherwise common engine), it may be possible to draw conclusions about useful life for both engine families from a single survey. We would expect such a survey to avoid sampling criteria or other statistical methods that would distort the results.

Conducting a survey is most straightforward when an engine is installed in a small number of equipment models and is generally placed into service such that usage characteristics are relatively uniform. This situation is common for the highest-volume handheld and nonhandheld products. A more challenging situation occurs when engines are installed in a wide range of equipment models and users have widely varying usage patterns. In these cases, we would expect manufacturers to make sound judgments in selecting dominant equipment models, applications, and usage characteristics to determine a useful-life value that best represents the median lifetime of the range of equipment in which the engines are installed. This may reflect a combination of commercial and residential use. Surveys could also take into account the possibility that individual owners may choose to retire a piece of equipment before it has reached the point of no longer being able to run (for example, by upgrading to a new model with additional features). The manufacturers are generally selecting the useful life from three nominal values, so the goal of any survey is limited to establishing the proper useful life only to that level of precision. We would not expect manufacturers to estimate the median lifetime of in-use equipment to the nearest hour to be able to select the useful life for an engine family for certification.

In discussions following the close of the comment period, some manufacturers expressed concern that gathering information from the field to determine appropriate useful-life values for each engine family would be very costly and time-consuming. We will be learning together how detailed that information needs to be and to what extent the information can be shared across engine families. In the meantime, we would also encourage nonhandheld engine manufacturers to consider the alternative specified in the regulations allowing for useful-life determinations based on engineering evaluation. Toward that end, we have made an effort to correlate engine design features with useful-life values. We considered including these design features directly in the regulation, but chose to continue with the broader approach consistent with the current specifications in §90.105. To the extent that nonhandheld engine manufacturers are unable to easily gather information to establish median equipment lifetimes corresponding to their engine families, we would consider the engine design features in the following table to be an adequate basis for establishing the useful life for a given engine family. Manufacturers using the values as indicated in the table would need to provide no additional information. We are aware that pressurized lubrication and cast-iron cylinder liners can take different forms (or have different degrees of quality and durability), but we would consider any form of these technologies to correspond to the indicated useful-life values, since they are clearly intended (and expected) to provide substantial improvements in engine operating life. We may revise this approach to correlating engine design features to useful-life values based on testing or other information that allows us to more carefully establish median lifetimes for specific designs.

Design Features for Nonhandheld Engines and Corresponding Useful Life Values

Design Features	Useful Life
Pressurized lubrication and more than one cylinder	1000 hours
Pressurized lubrication or more than one cylinder	500 hours
Engine displacement at or above 225 cc or a cylinder liner	250 hours
Any other engine design	125 hours

Finally, manufacturers may choose to do testing instead of relying on survey information. In this case, we would envision the manufacturer assembling five pieces of equipment that best represent the engine family. Testing could also be done with engines on a dynamometer. These engines could be exercised until the point of failure under normal operating conditions with proper maintenance throughout. The point of failure for the third failing engine would determine the median lifetime for the engine family. The appropriate useful-life selection would be the nominal value that is at least as high as the measured median lifetime. Manufacturers would need to use good judgment in making a determination regarding the point of failure, including consideration of the cost and ease of repair in the case of component failure and including consideration of equipment performance in the case of reduced power output (from lost compression, for example). It would not be appropriate to consider a piece of equipment to be at the end of its lifetime if a typical consumer with access to a reliable mechanic would have it repaired or would otherwise continue using it. We would not accept the idea that a typical consumer would as a matter of course dispose of equipment where an evaluation of the cost of maintenance would justify continued use of the equipment instead of purchasing a new unit.

2.4.3 Other labeling issues

What Commenters Said:

EMA commented that EPA must recognize the fact that in order to fit on products that typically are small, engine/equipment emission labels for Small SI engines are very small by necessity. Given the small size of the emission label, EPA should reconsider the labeling requirements incorporated in the final rule. EPA should only require the most relevant information to be on the label. Currently, the NPRM requires that the engine/equipment emissions label include all of the following information: a numerical designation of the emission durability period; Family Emission Limit (FEL); rated or intermediate speed; identification of the emission control system; adjustment/tune-up information; altitude kit requirements; fuel and lubricant requirements; and winter use identification. The inclusion of all of this information is not only impossible due to the size of the label, but unnecessary. Most of the information required to be included on the label by the NPRM is information that is included in the certification application and more appropriately included in the owner's manual. In addition, emission labels are easy to counterfeit and the presumption that the inclusion of such additional information will prevent or dissuade counterfeiting is not valid.

EMA believes the information provided on an engine/equipment emission label must be easily read and understood. If EPA requires too much information on such a small label, the label will become cluttered, the size of the print will be extremely small, and the label will be difficult to read. Adding to the content of the label will not ensure compliance. In fact, adding additional content to the label will thwart EPA's labeling goals because it will prevent the easy identification of (i) the engine/equipment manufacturer; (ii) compliance applicability; and (iii) date of manufacture. EMA commented that in order to ensure a label that is effective, and easy to read and understand, the emission labeling requirements should be limited to the inclusion of the following important information:

a. Manufacturers corporate name or trademark
b. Engine family name (exhaust)/ evaporative code (evap)
c. Date of manufacture (month and year) unless it is stamped or engraved elsewhere on the engine/equipment
d. The following statements of compliance (where applicable, the word "engine" would be replaced with the word "equipment"):
  i. Exhaust - "This engine complies with U.S. EPA Exh. Stds."
  ii. Evap. - "This engine complies with U.S. EPA Evap. Stds."
  iii. Exhaust & Evap. - "This engine complies with U.S. EPA EXH/EVP STDS."

EMA commented that the proposed requirement to include the FEL on the emission label is not acceptable because it precludes the manufacturer from (i) accurately representing the FEL (in the CARB PLT Credit situation); and (ii) making necessary retroactive changes to an FEL level. In addition, this requirement will impose an undue burden on both engine and equipment manufacturers because it will require the manufacturer to create new labels (and dispose of old label inventory) every time an FEL is changed, and to maintain both original and supplemental labels. The addition of the FEL to the engine label does not add information that is valuable to the equipment manufacturer, the ultimate purchaser, or EPA, and creates additional unjustified burden on the manufacturer. For these reasons, and in light of the limited available space on the engine label, manufacturers should not be required to include the FEL on the engine label.

EMA commented that due to the limited size of the engine label, information that is more appropriately included in the owner's manual should not be required to be included on the emission label. They commented that EPA should require the following information to be included in the owner's manual instead of on the emission label: (i) identification of the emission control system; (ii) adjustment / tune-up information; (iii) altitude kit requirements; and (iv) fuel and lubricant requirements.

EMA is opposed to the new emission label requirements for winter exclusive engines. Winter exclusive engines are uniquely configured to run in cold climates (e.g., they do not typically have air cleaners, and often have winter calibrations and hot air ducting), and would not run well or last long in other types of applications. Winter exclusive engines already are adequately identified and discernable from non-winter exclusive engines by the engine family name, and the engine manufacturer's scheme for encoding this information into their family naming convention. Accordingly, EMA commented that there is no need to include this information on the label. Such a requirement would unnecessarily take up space on an already crowded label.

EMA also opposed the additional requirement to identify rated or intermediate speed application restrictions on the emission label. This information does not add any value to the label content and should therefore be eliminated.

If EPA determines that it is necessary to identify delegated assembly engines on the emission compliance label, EMA commented that EPA should only do so with the use of an identifying mark on the permanent label, such as "DA" as an approved abbreviation for "delegated assembly."

Wherever possible, EMA commented that EPA should strive to minimize differences between EPA's and CARB's labeling requirements. The NPRM requires the following emission label heading: "EMISSION CONTROL INFORMATION"; while CARB requires either "IMPORTANT ENGINE INFORMATION" or "IMPORTANT EMISSION INFORMATION". There is no valid reason for EPA and CARB to have different emission label heading requirements. As such, EPA and CARB should align on this issue. In the past, EPA has accepted CARB label headings as an approved alternative. EMA urged EPA to include the CARB heading as an option in the final rule in order to avoid confusion and the need for additional approvals to achieve this critical alignment.

EMA believes the emission label is the appropriate location for identification of the manufacturer responsible for compliance and related emission warranty requirements. However, the NPRM appears to preclude those engine manufacturers that certify a complete engine (e.g., both exhaust and evaporative requirements) from using an integrated emission compliance label. EMA commented that engine manufacturers certifying a complete engine should be allowed to label products using a single emission compliance label. If the equipment manufacturer is the party responsible for introducing the complete evaporative control system into commerce, the equipment manufacturer should be allowed to provide the emission compliance label.

EMA commented on §1054.135(c)(5) stating that the requirement to include engine displacement on the label adds no value to either the customer or EPA and should be deleted from the labeling requirements.

EMA commented on §1054.135(g) stating that the proposed language would preclude engine manufacturers that certify a complete engine to both the exhaust and evaporative requirements defined in 40 CFR Part 1060 from using a viable integrated label. EMA commented that this section should be revised to read as follows: "Manufacturers that certify compliance to both the exhaust and evaporative requirements of 40 CFR Part 1054 and 40 CFR Part 1060 may meet the labeling requirements using a single label that provides all of the required information from both parts."

EMA commented on §1054.136 "How must I permanently label the equipment I produce?" EMA commented that this section is redundant and should be deleted.

Honda requested that EPA reconsider the entire proposed requirements for engine labeling. Honda's evaluation of the proposed label and contents that would be required for many engines indicated that the label size and content would be significantly increased due to declarative statements and other label information, with little or no added value. Honda believes that a simplified label with the certifying organization identification or logo, engine manufacturer identification (corporate name or trademark) and a single alpha-numeric designator could fully signify engine regulatory compliance.

Honda commented that the information on a certification label has extremely limited value to anyone in the supply chain other than a U.S. Customs or EPA Inspector attempting to match the manufacturer and engine with a specific Certificate of Conformity and that engine's certification information. Furthermore, they believe the emission label information is of limited value to the engine purchaser, both individual and corporate, because they rely in their purchase decisions on business-relevant information such as model and engine type or catalog number which are typically stamped in the engine block or on another label. Fundamentally, the emission label does not receive any level of attention by or provide any usefulness to buyers or users, regardless of unit production volume.

Honda recognized EPA's concern for counterfeiting of labels, but they do not believe that EPA's proposal will prevent counterfeiting. Honda also recognized EPA's desire to provide distinction between uncertified and certified products. Nevertheless, they believe there is a much better and effective approach to addressing these two needs than merely expanding the information on a label. Specifically, Honda suggested that EPA work with industry to establish revisions to the certification application that would provide data for an EPA database that could be electronically accessed by those with a need to know (U.S. Custom's inspectors) and correlated with information that is part of the engine itself, e.g., stamped engine identification information or an engine identification number on the label. Perhaps the month and year of engine manufacture would be a necessary supplement if the manufacturer does not maintain a readily available database of serial number and corresponding date of manufacture. However, the manufacturer name on the label may also be redundant since it is typically on the engine itself and also coded into the engine family name.

OPEI noted that EPA's regulatory language states the label must contain month and year of manufacture with no allowance for variation (see 1060.135(b)(2) and 1054.135(c)(6)). OPEI commented that the minimum requirement should be month and year. Production time intervals less than a month should also be allowed, for example, week or day. OPEI also requested that the date of manufacture be allowed in a code on the label. (For example A06 means January 2006, B06 means February 2006.) OPEI stated that EPA currently allows for coded date of manufacture and should reflect this in the regulatory language.

OPEI commented that EPA has set precedence in the past for allowing for the deletion of the specific model year on the label and replacing it with a term like "this product complies with EPA Phase 2 standards" or "this product complies with EPA standards for 2002 and later." Since Class III, IV, and V handheld products have no exhaust changes, OPEI requested that EPA add language to §1054.135(c)(12) that will allow the use of standard language that will not need pre-approval for EPA such as: "THIS ENGINE COMPLIES WITH U.S. EPA PHASE 3 REGULATIONS FOR …" or "THIS ENGINE COMPLIES WITH U.S. EPA EXHAUST REGULATIONS FOR 2010 AND LATER MODEL YEAR"

Letters:

Commenter	Document #
EMA	0691
Honda	0705
OPEI	0675

Our Response:

All the information that we proposed to require on emission labels relates fundamentally to compliance with emission standards. This information is useful in varying degrees to consumers, equipment manufacturers, and EPA and Customs inspectors. We also note that manufacturers have been successful so far in creating and applying labels with all the information we require under the current regulations, without creating confusion or otherwise thwarting our labeling goals. Nevertheless, we agree with the suggestion in the comments that we should pursue alternative means to make some of this information available. In large part, our interest in narrowing the required label content is based on the disproportionate amount of time it takes to handle requests for variations from the regulatory specifications. As a result, we have gone through the effort to reduce the required label content to the minimum needed for the label to ensure compliance, given our (and the manufacturers') current and projected abilities to manage the additional information. By reducing the label content in this way, we believe we have also reached a point at which we can disallow any variations from the specified label content for these few pieces of information. This will significantly streamline the preparation, review, and approval of emission labels.

We generally agree with EMA's assessment regarding the essential elements of the emission label. The manufacturer's corporate name and the applicable family identification must be included. Manufacturers may add their trademark, but this is not required. The date of manufacture must be included, unless it is stamped or engraved elsewhere on the engine. A modified compliance statement must be included, as described below. We believe the label should include two additional items. First, as described in Section 2.4.2, the label must identify the engine's useful life. Second, if the family includes engines with differing displacement values, the displacement of each engine should be identified on the label. This would be the only way to readily determine which standards apply to each engine since the displacement information embedded in the engine family name would not necessarily apply. If manufacturers want to avoid separately identifying displacement information on the label in this situation, they could simply certify the engines in different engine families.

Further reducing content to include only a code for looking up all the information may be possible in the future, but we believe the EMA comments represent a more realistic middle ground for the foreseeable future. A label with nothing but a code for looking up relevant information would prevent the label from having any value without being able to access the database. We believe there will be times when owners, equipment manufacturers, and EPA and Customs inspectors should be able to identify the basic engine and compliance information by a simple visual inspection of the engine.

The label items included in the proposal but not in the final rule can be appropriately included in the owner's manual. This includes the identification of the emission controls system, tune-up specifications, information related to operation at high altitude, fuel and lubricant specifications, limitations on engine use at rated or intermediate speeds (if applicable), and limitations on engine use in wintertime equipment (if applicable).

While the owner's manual is useful for identifying these additional items, this is of little value to EPA or Customs inspectors or even to owners if they don't have or don't use the owner's manual, as is commonly the case. To address this concern, we may pursue system improvements that would allow us to readily access the database that includes this information. In this scenario, an inspector with a laptop or handheld device with Internet access would be able to use the engine family identification number to quickly look up all the highlighted information that is relevant for a given engine. This would allow us to create a very accessible virtual label without being constrained by space limitations.

As described in Section 2.4.1, we agree that emission labels do not need to include the applicable family emission limit. This is based on the alternative requirement to track changing family emission limits by date of manufacture and serial number rather than the reasons identified by the commenters.

See Section 1.3.2 for a discussion of build dates on labels, compared with engine manufacturers keeping records with this information. We agree that build dates should be based on identifying the month and year at a minimum. We don't believe it is appropriate to use coded information to identify the build date. This is especially important given the discretion we are allowing to create family codes for compliance with evaporative emission standards, as described in Section 4.6. Identifying the full month and year would be preferred (e.g., February 2009). We would also find standard abbreviations acceptable, such as Feb 09 or 02/09. We intend to pursue regulatory amendments to clarify the format of build dates on engines or emission labels, with the goal of adopting uniform specifications across all our programs.

Fundamental to certifying engines under the Clean Air Act is the idea that the certificate is valid for a given model year. Manufacturers must recertify all their engines for every new model year. In some cases a manufacturer may produce certified engines in a given year and not renew certification for the following year. This is a case where the model year information would be necessary to identify the compliance status of the engines properly produced under a valid certificate and to avoid improperly labeling for the engines produced when there was no valid certificate. We are also adding regulatory language to ensure that manufacturers properly align their build dates and overall production periods with the dates defining the model year for the particular engine family, as identified by the effective dates for the certificate. See Section 1.5.2 for further discussion of issues related to build dates and model years.

The information related to wintertime use and rated-speed/intermediate-speed operation is mostly intended for equipment manufacturers to ensure that engines are installed in equipment consistent with any applicable limits on the engines' certification. We believe these items should be included in the owner's manual for completeness. We also separately require that engine manufacturers make clear in their installation instructions that equipment manufacturers install engines such that they remain in a certified configuration if there are any limits on the range of applications covered by the certificate.

We agree that an abbreviation for "Delegated Assembly" may be necessary. However we believe the abbreviation should be no shorter than "DEL ASSY". Such an abbreviation will allow for continued recognition of the terms for an informed reader/inspector, without resorting to a two-letter code that could ultimately be overlooked or misunderstood. This is especially important given the discretion we are allowing to create family codes for compliance with evaporative emission standards, as described in Section 4.

As described above, our primary motivation to reduce the label content as much as possible is to standardize labels and avoid requests for alternative wording and formatting. Accordingly, we do not believe it is necessary or appropriate to create a path for alternative labeling for the label heading. Our understanding is that California has agreed to allow manufacturers to meet their requirements with EPA's label heading, so this should not be an issue under the Phase 3 program.

We believe the proposed language in §1054.135(g) clearly and explicitly allowed integrated manufacturers to use a single label for meeting requirements for compliance with both exhaust and evaporative standards. We have nevertheless modified the wording to align with the language suggested in the comment.

We agree that the proposed §1054.136 does not add new requirements and is not necessary for highlighting other requirements that apply for equipment manufacturers. We have removed this section for the final rule.

2.4.4 Maintenance

What Commenters Said:

OPEI noted that the maintenance provisions for handheld engines are outlined according to §1054.145(c)(3). This paragraph allows the continued use of maintenance provisions outlined in EPA Phase 2 for certification and deterioration factor (DF) engines. OPEI also noted this provision has no expiration date. OPEI further noted that the maintenance provisions outlined in 1054.125 do not apply to handheld engines. OPEI requested that EPA add language to 1054.125 indicating this section does not apply to handheld engines.

EMA and OPEI commented that EPA should allow the following critical emission-related maintenance practices during the determination of deterioration factors based on the maintenance schedule provided to users: air filter, spark plug, valve lash adjustment, and two-cycle exhaust port carbon removal. These practices are well understood in the market place and have been utilized for many years in order to ensure that engines perform their intended function for their expected lifetime. EMA and OPEI also commented that EPA should explicitly acknowledge that the following maintenance practices are critical emission-related maintenance that cannot be conducted during the determination of deterioration factors: internal combustion chamber deposit removal, valve or valve seat reconditioning (including lapping, grinding, or cutting), and replacement of exhaust aftertreatment components.

EMA commented that air filter maintenance generally is prescribed by the engine manufacturer for all customers. Such maintenance instructions typically include provisions that address adverse environmental conditions that may require more frequent maintenance. Depending on the air filter design, such maintenance could include cleaning or replacement. Engine deterioration factor determination must be allowed to utilize the maintenance as prescribed to the customers operating in a clean environment typically utilized for engine aging.

EMA commented that if there is a concern that manufacturer defined maintenance intervals are too close to prescribed emission testing points, the final rule should require both pre- and post-maintenance emission tests on a case-by-case basis. For example, CARB requires pre- and post-maintenance testing if the emission test point is within 10 hours of the prescribed maintenance.

EMA commented on §1054.125(a) "What maintenance instructions must I give to buyers?" EMA commented that the requirement to demonstrate that scheduled maintenance is reasonably likely to be performed is impractical. Small SI engine maintenance is typically done by either the owner or an independent dealer. For the individual home owner, maintenance intervals are typically dictated by seasonal time and use patterns. However, the same engine utilized by a semi-commercial owner/operator may be serviced routinely on a use basis. Typical maintenance not covered by defect warranty that involves cleaning (such as air filters) or adjustment (such as valve clearance) do not generate any documentation available to the engine manufacturer. Generically available items (such as spark plugs) are impractical for engine manufacturers to document due to the sheer number of suppliers and retail outlets selling such merchandise. EMA believes a limited and explicit list of acceptable emission-related maintenance must be identified in the final rule, along with a provision that allows engine manufacturers to demonstrate why additional critical emission related maintenance not specified in the rule should be allowed. EMA commented that allowable critical emission-related maintenance during service accumulation and emissions durability determination should include air filter cleaning/changes, valve lash adjustment and spark plug changes. The frequency of this maintenance must be consistent with the engine operator's manual. EMA commented that internal engine maintenance, such as decarboning of the engine combustion chamber, re-seating of the valves, or other maintenance should explicitly be included in §1054.125(a)(2).

EMA commented that the parts identified in §1054.125(d) "What maintenance instructions must I give to buyers?" must be revised in order to agree with the proposed revisions to §1054.125(a). Further, the second sentence should be revised to read as follows: "Noncritical emission-related maintenance generally includes re-seating valves, removing combustion chamber deposits, or any other maintenance related to emission-related parts as specified in 40 CFR Part 1068, Appendix I."

EMA commented on §1054.125(e) "What maintenance instructions must I give to buyers?" EMA commented that based on the proposed language in §1054.125(a), valve lash should be removed from the list of potential non-emission related maintenance.

EMA commented on the definition of critical emission-related components set forth in §1054.801. EMA commented that the proposed definition does not include air filters or spark plugs. They noted that such parts are included in the definition of critical emission related parts elsewhere in the proposal.

Kohler commented that it has concerns with the current maintenance allowed during DF testing in Part 90 and the wording in the proposed regulation §1054.125(a). Kohler commented that normal maintenance should be allowed to be required in the owner's manual without performing surveys etc. Any maintenance such as changing sparkplugs, air filters, and oil are all normal and accepted by industry and should not require any special survey or demonstration on the part of the manufacturer to be allowed to include them as a requirement in the manual.

Kohler noted that §1054.125(d) states that you cannot change an air filter or sparkplug during service accumulation. Kohler commented that this statement needs to be changed to "you cannot change an air filter or sparkplug during service accumulation for DF testing at intervals different than that specified in the owners manual."

CARB noted that EPA proposed to allow emission-related maintenance during DF testing if "60 to 80 percent of in-use engines get the specified maintenance at the recommended interval." As noted in the preamble, the small spark-ignition engines are predominantly operated by homeowners and experience widely varying service practices. To ensure that the DFs do actually represent in-use engines, it is crucial that maintenance that is not likely to be performed in-use is not allowed for test engines. To strike a balance, CARB recommended alignment with other maintenance-related provisions that were adopted recently for the on-road heavy-duty category requiring an 80 percent survey and other provisions.

Letters:

Commenter	Document #
OPEI	0675
CARB	0682
Kohler	0703
EMA	0691

Our Response:

We agree that the maintenance provisions of §1054.125 do not yet apply to handheld engines (as specified in the proposed §1054.145(c)(3)). This is necessary because we are not changing the stringency of the exhaust emission standards for handheld engines. Changing the allowable maintenance during service accumulation for certification could affect emissions in a way that would effectively change the emission standards for those engines. We expect to apply the provisions of §1054.125 to handheld engines without modification when we adopt the next phase of standards for those engines. We therefore agree that it is appropriate to add a note to §1054.125 to clarify that the maintenance provisions of that section do not apply to Phase 3 handheld engines.

We also agree that the regulations should clearly disallow removal of combustion chamber deposits, reconditioning of valves and valve seats, or replacing aftertreatment components. These would rarely be performed as normal maintenance practices by owners so they should also not occur during service accumulation for certification. We note too that we have no reason to believe that carbon removal from exhaust ports on two-stroke engines can be considered normal maintenance, so we do not believe that would be an appropriate maintenance step during service accumulation. We expect that all two-stroke engines certified to Phase 3 standards will be handheld engines. As described above, the provisions of §1054.125 do not apply to handheld engines, so we will revisit the question of maintenance for these engines when we adopt the next phase of standards. We do not expect to allow carbon removal from exhaust ports during service accumulation unless there is clear evidence demonstrating that this maintenance is typical for in-use engines.

It is clear that some owners clean or replace air filters and spark plugs on the schedule prescribed in the owners manual. This would be the case for fastidious homeowners wanting to make their equipment last as long as possible or commercial owners interested in reducing the costs associated with repairing or replacing aged equipment. We remain unconvinced that in-use maintenance related to air filters and spark plugs is so prevalent that manufacturers should perform these maintenance steps during service accumulation. There are surely many owners who, perhaps in spite of best intentions, fail to invest the time, effort, and expense of preventive maintenance. There is clearly some tendency to treat Small SI engines and equipment as disposable items, running with minimal maintenance until a problem surfaces, then evaluating whether to make a repair or just replace the equipment. Especially with low price-point consumer products, repair costs (and even some preventive maintenance costs) would be high enough that many owners would minimize maintenance and repairs and opt instead to purchase a replacement model after a few years. Even for commercial operations, Small SI equipment many times would represent a small part of a much larger operation. As such, companies operating these engines would in many cases not make it a priority to coordinate a regular schedule of preventive maintenance. For both homeowners and commercial users, we believe the likelihood of taking preventive maintenance steps on the prescribed schedule falls dramatically after the first year of service (or for second owners). Performing a survey to establish current maintenance practices would be very helpful, but we understand the constraints on getting this information described in the comments.

Limiting maintenance during service accumulation for certification to align with the prevailing in-use practice is important to avoid a situation where manufacturers are able to achieve the necessary level of emission control in the laboratory while in-use engines are emitting at higher levels because these same maintenance steps are not being done. To the extent that maintenance might not be performed in the field, manufacturers should have the incentive to design their engines such that they do not depend on this maintenance to comply with emission standards. For example, as described in the proposal, we are concerned that air filters may become coated with oil mist on the downstream side. Intake systems can be designed to prevent this by carefully designing the pressure dynamics of the intake system and the venting of crankcase gases (and oil mist) into the intake system to prevent the entrained oil from reaching the back side of the air filter. In contrast, if we allow routine air filter changes as prescribed in the owners manual, there is no need to improve these designs, even though the problem would occur with any in-use engines that do not get the scheduled filter changes.

Having said that, we also note that our testing to establish the feasibility of the proposed standards involved a rigorous effort to perform maintenance as prescribed in the respective owners manuals, which generally involved air filter maintenance every 25 hours and spark plug changes every 100 hours. Based on this experience, we don't believe we should entirely disallow these maintenance steps for certification for demonstrating compliance with the Phase 3 standards. We therefore believe it would be appropriate to allow manufacturers to clean or change air filters and spark plugs, as long as manufacturers perform emission measurements before and after these maintenance steps. It would be best to perform testing after each maintenance step; however, we would find it acceptable if manufacturers tested engines before and after maintenance after every other air filter change. Manufacturers would use the average of these two results for calculating deterioration factors. However, every measured test point would need to be under the emission standard to be considered in compliance. This approach allows for continued performance of these maintenance steps, consistent with our feasibility testing, but properly identifies the effect on emissions.

Most Class I engines are certified with a useful life of 125 hours. Since manufacturers do durability testing halfway through the useful life, this would be a normal point of replacing the air filter. If manufacturers specify filter replacements every 25 hours, this would involve only a small adjustment to fit with the planned testing. If manufacturers specify filter replacements every 25 hours, they would need measure emissions before and after changing the air filter after the second filter change at 50 hours, or they could opt for a 30-hour filter change interval and simply test at the scheduled midpoint for service accumulation.

Laboratories where service accumulation occurs generally have very little dust or airborne debris that is common in the in-use environment. We believe it is well within reach for manufacturers to design their engines for extended operation without needing cleaning or replacement of air filters. We believe this approach properly balances the manufacturers' interest of performing maintenance during certification with our interest of documenting the emission effects of this maintenance and maintaining the incentive for manufacturers to design their engines to be dependent on maintenance as little as possible.

Some Class I engines and all Class II engines are certified with a useful life of 250 hours or longer. Testing these engines at the midpoint of their service accumulation involves a correspondingly longer period. At the extreme, a 1000-hour useful life would involve testing after 500 hours of operation. To avoid additional test points, manufacturers would need to design their engines to meet standards without cleaning or changing air filters for 250 hours or spark plugs for 500 hours. While this involves a greater challenge, we think it is even more achievable for these engines where the reduced price sensitivity does not impose such a challenging constraint in properly designing and manufacturing these engines. We believe these longer useful-life engines should be capable of operating on a controlled test fuel in a controlled environment for 250 hours without servicing air filters and for 500 hours without replacing spark plugs. However, as described above, we believe it is appropriate to allow for more frequent service as long as the manufacturer performs emission tests before and after the maintenance to document the effect on emissions.

In pursuing more stringent emission standards in the future, we intend to more carefully demonstrate the feasibility of achieving effective emission control over the full useful life with maintenance intervals that more appropriately reflect any reduced level of service that may be typical of the in-use experience for Small SI engines. We would then be able to set more careful limits on the maintenance that manufacturers may perform during service accumulation such that certified engines will not depend on maintenance that may not be occurring with in-use engines.

We have modified §1054.125 and §1054.801 to include air filters and spark plugs as critical emission-related maintenance.

Consistent with the proposal and all our other programs, we believe that adjusting valve lash is not emission-related maintenance. Including valve-lash adjustments in §1054.125(e) allows manufacturers to perform this maintenance during service accumulation at the least frequent interval specified in the owners manual. This approach addresses the manufacturers' interest in performing this maintenance on their recommended schedule.

The first four paragraphs of §90.118 were adopted as part of the initial phase of standards, in which there was no service accumulation beyond engine stabilization. When part 90 was modified for the Phase 2 standards, there were no changes in the regulation to add specific requirements or prohibitions related to maintenance during the service accumulation period between stabilization and the end of the useful life. As such, we have concluded that only oil and filter changes may be done before stabilization is complete, and manufacturers may follow the scheduled maintenance specified in the owner's manual for the rest of the service-accumulation period.

2.4.5 Deterioration factors/bench aging

What Commenters Said:

OPEI and EMA commented that EPA should allow for the future development and use of an aftertreatment bench aging procedure. However, due to the complexity of such development, the limitations and appropriateness of any procedure must adequately be assessed.

OPEI commented that if a manufacturer can show that due to field-testing, the bench DF cycle is too aggressive, EPA may approve an alternative test cycle based on data the manufacturer provides.

OPEI noted per CARB requirements that the calculation of a DF must involve at least three test points (zero/midpoint and end of test). If a maintenance interval is scheduled at a test point, the emission test should be run both before and after the maintenance. The emission test results should then be averaged for the value to be used in the calculation. OPEI commented that EPA should specify the same requirement in §1054.245 to avoid confusion.

CARB commented that operating and testing the complete engine is necessary to get accurate deterioration factors (DF). They noted that some manufacturers are using bench-aging of components, including catalysts, to identify the worst-case scenario amongst models/components. Subsequently, DFs are developed on the worst-case model/configuration using full service accumulation on a dynamometer or in-use. CARB commented that bench-aging of components and other alternative procedures should be allowed only if manufacturers provide adequate correlation data between their aging procedure and normal service accumulation. Regarding assigned DFs, CARB commented that these should be limited to just California small-volume manufacturers (less than 500 total units per year). Other manufacturers are required by California regulations to develop their own DFs so EPA's use of those same DFs would not impose any burden on manufacturers.

ECO noted that EPA proposed an allowance for small volume engine families to utilize assigned deterioration factors and requested input on the use of assigned DFs for small volume engine families. ECO commented that this provision is necessary to allow flexibility for small volume engine families.

Letters:

Commenter	Document #
OPEI	0675
CARB	0682
EMA	0691
ECO	0712

Our Response:

We understand that a bench aging procedure has the potential to provide effective deterioration factors at a substantially lower cost compared with aging engines with complete systems on an engine dynamometer. As noted in the proposal and reiterated in the comments however, we would want to be very sure that a specific bench aging procedure would adequately represent aging from complete in-use engines. A fundamental factor in evaluating the appropriateness of any bench-aging procedure is the extent to which it simulates representative exhaust gas composition and other in-use operating parameters. Any bench-aging procedure would therefore need to take into account a wide range of variables to provide an adequate simulation.

We agree that the regulation should be changed to require testing at the midpoint of service accumulation. This provides additional information and aligns with the requirements already in place in California. See Section 2.4.4 for a discussion of issues related to maintenance during service accumulation.

We continue to believe it is appropriate to include a provision for assigned deterioration factors for small-volume engine families, even if the certifying company is not a small business.

There may be several cases where the manufacturer produces only engines for equipment that is preempted from California regulations, or that is not sold in California at all. We agree that it is not helpful to allow for assigned deterioration factors where the engine manufacturer will have to develop its own deterioration factor for the same engine family in California. However, we would not want to disallow the use of assigned deterioration factors for those small-volume engine families where the manufacturer does not need to do service accumulation to establish a deterioration factor for California.

2.4.6 Warranty

What Commenters Said:

EMA commented that engine manufacturers must have the ability to shorten emission warranty periods for engines that accumulate hours at a high rate such that they exceed 50% of their specified emission durability period prior to the expiration of the prescribed emission warranty period.

EMA commented that the proposed emission related warranty parts list requirements duplicate the information provided in 40 CFR Part 1068, Appendix I. They recommended that the emission related parts list be inclusive of the emission related components identified in the certification application, which also references 40 CFR Part 1068, Appendix I.

EMA commented that for engines certified using aftertreatment or intake systems supplied by the equipment manufacturer under the delegated assembly provisions defined in §1054.610, that the warranty requirements be transferred to the equipment manufacturer. Engine manufacturers should be required to maintain a cross reference such that any customer request for warranty associated with a component provided by the equipment manufacturer would be referred to the appropriate equipment manufacturer.

EMA commented on §1054.120 "What emission-related warranty requirements apply to me?" EMA commented that the regulations should be revised in order to clarify to whom the section applies. Specifically, they recommended that the section be revised to read as follows: "The requirements of this section apply to the manufacturer that certifies compliance with the exhaust emission requirements of this part. See 40 CFR Part 1060.120 for evaporative emission warranty requirements."

EMA noted that under §90.1103(a), the warranty period should begin on the date of sale to the ultimate purchaser. Accordingly, EMA commented that the sixth sentence of §1054.120(b) "What emission-related warranty requirements apply to me?" should be revised to read as follows: "The warranty period begins on the date of sale to the ultimate purchaser." They also commented that this section should provide an option for decreased warranty period in order to provide a differentiation between consumer and commercial usage of non-handheld products similar to what is provided for handheld equipment in §1054.120(b)(2). Finally, EMA commented that EPA should add the following language as §1054.120(b)(4): "Any end user that purchases a Consumer Product and uses it Commercially will have a shorter warranty period."

Honda commented that nonhandheld engines in commercial equipment should also specifically have the same option granted for handheld seasonal equipment, to limit the warranty time period based on the product's use even without an engine or equipment hour meter. This suggestion is made in reference to §1054.107. Honda noted that it is in §1054.120(b)(2) where EPA has made an allowance for the seasonal use of handheld equipment. The regulations state, "We may establish a shorter warranty period for handheld engines subject to severe service in seasonal equipment if we determine that these engines are likely to operate for a number of hours greater than the applicable useful life within 24 months. You must request this shorter warranty period in your application for certification or in an earlier submission." EPA has in this section recognized that commercial equipment is very likely to be used for many more hours in less calendar time than would be expected for homeowner operated equipment.

Letters:

Commenter	Document #
Honda	0705
EMA	0691

Our Response:

We believe §1054.120 appropriately defines the engine components that are subject to the emission-related warranty. The commenter's suggestion for the warranty to cover only those parts listed in the application for certification would allow manufacturers to avoid warranty coverage for a given component simply by leaving it out of the description in the application. The broader language included in §1054.120 is necessary to ensure that components will be covered even if manufacturers develop an emission control technology with components that would not be covered by the specific list given in Part 1068, Appendix I.

The certificate holder always bears the primary responsibility for ensuring that engines have proper warranty coverage. Certifying engine manufacturers may choose to cooperate with equipment manufacturers in the interface with owners, but we would hold the certificate holder responsible for compliance with warranty obligations. We could also pursue recourse against equipment manufacturers, importers, or retailers for having caused the violation if we are able to establish that any of those parties did not take basic steps to ensure that there was an effective plan for meeting warranty requirements.

The provision for shorter warranty periods for handheld engines used seasonally in severe service can work because the companies making the engines also install the engines in their own equipment. They can therefore understand the range of expected operation in the field for their certified engines. (We note, however, that no handheld manufacturer has requested this shorter warranty for engines used in seasonal equipment.) This is generally not the case for nonhandheld engines. Even those manufacturers that also make equipment will sell many loose engines from the same engine family to other equipment manufacturers. It is therefore difficult to conceive of an engine manufacturer being able to adequately demonstrate the seasonal or severe-duty nature of the expected in-field operation. While this may occur for some engine installations, there could be many other installations where equipment manufacturers and/or owners simply want a more reliable engine for operation that is neither seasonal nor severe-duty.

We note too the increasing likelihood that commercial engines will have electronic controls and fuel injection. While these will be simple systems, they will include the ability to clock engine operating hours. Since we allow for a shorter warranty period based on engine operating hours, it would be unnecessary for manufacturers to have any special approval for a shorter warranty period based on seasonal and severe-duty operation.

We don't believe it is appropriate to specify that a shorter warranty period applies for commercial use of products that are intended for consumer applications. Many types of equipment are not clearly differentiated between consumer and commercial applications. Similarly, a person's use of any given piece of equipment is many times not easily distinguishable between consumer and commercial applications. The suggested language could therefore not be clearly applied to adjust warranty periods for these products. As described above, we believe the best long-term approach is to anticipate that many or most engines in commercial service will have hour meters that will indicate an end to the warranty period based on the engine's operating hours rather than counting months on the calendar.

We agree that §1054.120 should more carefully state that the section applies to manufacturers that certify with respect to exhaust emissions, with part 1060 covering warranty obligations with respect to evaporative emissions. We also agree that the warranty period should start at the point of sale rather than the date the engine is placed into service, consistent with the prevailing practice for standard warranties on consumer products. This avoids a situation where owners could make unverifiable claims that they first placed the engine into service several months after making the purchase.

2.4.7 Naming labs and ports for imported products

See Section 1.3.1 for an analysis of the comments related to the requirements for importing manufacturers to identify the ports where they import products and to name a laboratory in the United States for testing their engines.

2.4.8 Engine family criteria

What Commenters Said:

OPEI commented on §1054.230(b) recommending that EPA should include in the list that families with displacements within 15% can be grouped together. This has been proven reliable and acceptable for EPA Phases 1 and 2 as well as CARB Tier I/II/III.

EMA noted that engine manufacturers producing multi-fuel engines recognize that they must evaluate the different fuel influences in order to determine the worst case configuration associated with the compliance demonstration for any engine family. EMA commented that it is important that engine manufacturers be allowed to utilize their best engineering judgment in order to determine which fuel and resulting engine configuration represents the worst case configuration for a given family and, therefore, be used for the certification data development process. For example, an engine family may include both propane and natural gas fuel options for an engine model, but the engine manufacturer should be allowed to determine the worst case configuration for certification testing using their best engineering judgment.

EMA commented on §1054.230(b) "How do I select emission families?" EMA noted that pursuant to 40 CFR Part 90.116(d)(5), engines of different displacements that are within 15% of the largest displacement may be included within the same engine family. While this flexibility is implicit in the proposed rule, EMA requested that EPA include a statement in the preamble clearly stating that the intent of the language is to allow engine models of varying displacements (such as specified in §90.116) to be combined into one family at the manufacturer's option.

EMA commented on §1054.230(f) "How do I select emission families?" EMA commented that because Part 1054 does not identify the requirements associated with obtaining an evaporative certificate of compliance, it is not appropriate for this section to discuss evaporative component selection. Because all of the evaporative requirements refer the engine manufacturer to Part 1060, EMA commented that it is both redundant and confusing to include evaporative requirements within the requirements controlling the exhaust certification process.

Honda commented that the engine family determination criteria in the final rule should state that engines with a 15% displacement difference (percentage based on largest engine) may be in the same engine family if they have similar emission characteristics. Honda also commented that if a manufacturer can demonstrate that engines with a larger displacement difference also have similar emission characteristics, the manufacturer should also be able to get approval for inclusion in the same family.

Letters:

Commenter	Document #
Honda	0705
OPEI	0675
EMA	0691

Our Response:

Under part 90 we have approved the combination of engines within a single family if the range in displacement is within 15 percent of the largest engine's displacement. The proposed regulatory language for part 1054 specifies that engines must have the same "approximate bore diameter of cylinders." We have adopted this language broadly across most of our programs. We are adopting the proposed regulatory language without modification. We believe this is the best approach, giving a clear guideline but allowing enough discretion to be able to respond to any particular situations that may arise. We will continue to approve combined engine families based on the 15-percent displacement threshold. This maintains a harmonized policy with California and is generally consistent with the way we have implemented other EPA programs. We may also decide in special circumstances that a different threshold should apply.

We agree that dual-fuel engines represent a special case for differentiating engine families. Clearly one engine that can run on multiple fuels must be in a single engine family. The approach EMA describes in which the engine manufacturer chooses the worst-case fuel for certification testing is appropriate. We note, however, that an engine that fails to meet the applicable emission standards when operating on any of the specified fuels is noncompliant. We have revised the regulatory language to clarify that fuel type differentiates engine families, except in the case of dual-fuel engines. We have also added a clarification to §1054.235 to say that we may require manufacturers to submit data using the fuel not yet included in testing, and that such a test would be treated as if it were a second engine rather than a replacement for the original data.

We agree that §1054.230 should reference part 1060 to clarify how to define emission families with respect to evaporative emissions, rather than including that information directly. The final regulations have been changed accordingly.

2.4.9 Other certification issues

What Commenters Said:

OPEI noted that EPA is asking manufacturers to report CO_2 in §1054.205(p). OPEI questioned why EPA was asking for the information and commented that if EPA wants CO_2 reported, then manufacturers should be provided with requirements on how it should be reported (units, calculation etc).

OPEI commented that under paragraph 1054.640(c), if the manufacturer is responsible to EPA, then paragraphs (a) and (b) are an unnecessary burden and should be deleted.

EMA commented that EPA should clarify where in the certification application the additional information required by §90.107(d)(11)-(15) should be included.

EMA commented on §1054.130 "What installation instructions must I give to equipment manufacturers?" EMA commented that installation instructions for equipment that is not subject to the provisions of the delegated assembly requirements in §1054.610 should be limited to features consistent with the requirement to assure that the engine is in its certified configuration. EMA noted that these instructions are generally not explicit instructions, but rather a process used by engine manufacturers to approve the use of their engine in any equipment according to the engine manufacturer's requirements. For example, exhaust back pressure or intake air temperature rise may be specified to assure emission compliance and also expected performance. Accordingly, EMA commented that this section should be substantially revised to read as follows:

> "(a) If you sell an engine for someone else to install in a piece of equipment, make available the information required to ensure that as installed the engine will be in its certified configuration.
> (b) If the engine does not include provisions to control evaporative emissions advise the equipment manufacturer to refer to 40 CFR Part 1060 for applicable requirements.

> (c) Provide information to the equipment manufacturer that if installation precludes visibility of the engine's emission control label that a duplicate label must be added to the equipment in a visible location."

EMA commented on §1054.205(o)(1) "What must I include in my application?" EMA commented that the reference to THC or THCE should be expanded to include NMHC as required by §1054.103(c)(2).

EMA commented on §1054.250(a) "What records must I keep and what reports must I send to EPA?" EMA commented that the requirement to submit volume reports within 30 days is inconsistent with current EPA requirements, is not adequately defined, and is inappropriate. EMA noted that existing reporting requirements provide manufacturers 45 calendar days for reporting. Accordingly, EMA commented that the reporting requirement should be revised to 45 calendar days.

EMA commented on §1054.250(b)(4) "What records must I keep and what reports must I send to EPA?" EMA commented that it is not practical to require manufacturers to maintain production volume records for each engine family by assembly plant. In many cases, there are multiple steps in the assembly process that may be completed at different assembly plants thereby making this information either meaningless or impractical to determine. EMA recommended that this record retention requirement should be revised to require records regarding the total production volume for each engine family.

Kohler commented that a consistent test cycle between engine manufacturers is critical to maintaining a level playing field. This applies to both dynamometer emissions testing as well as DF hour accumulation. Kohler requested that in the Phase 3 regulation, EPA take action to maintain a level playing field for all manufacturers by assigning alphanumeric designators to all approved alternative test cycles and posting these to the EPA website. This would include alternate procedures for dynamometer testing as well as the approved cycles (speed/load/time) for DF hour accumulation. Kohler had the following recommendations for specific language modifications.

> §1054.501 (c) Alternate test procedures — EPA allows engine manufactures to request approval for the use of an alternate test cycle if they cannot run the test cycle specified in this part. If an engine manufacturer requests and receives approval these MUST be given an alphanumeric designation and posted on the EPA website and be available for anyone to use.

> Kohler noted that §90.104 (h)(2)(ii) currently states that engine manufacturers should . . . "Conduct such emission testing again following aging the engine. The aging procedure should be designed to allow the manufacturer to appropriately predict the in-use emission deterioration expected over the useful life of the engine, taking into account the type of wear and other deterioration mechanisms expected under typical consumer use which could affect emissions performance. If more than one engine is tested, average the results and round to the same number of decimal places contained in the applicable standard, expressed to one additional significant figure".

Kohler noted that there is no specific aging procedure defined. Many manufacturers today, including Kohler, use repetitive cycles of the 6-mode certification test cycle for aging the engine.

However, there is no public information available that states what procedure is being used by individual engine manufacturers. To maintain a level playing field Kohler requested that the following wording be used in the regulation:

> "Conduct such emission testing again following aging of the engine. The aging procedure must accumulate service (age the engine) in a way that represents how you expect the engine to operate in use and be approved by EPA. EPA's approval will assign an identification code for the cycle to be utilized in the manufacturer's certification application(s) for all applicable engine families. Approved test cycles will be listed with their respective identification code on the Small Spark Ignition Certification website and available for any applicable engine family. If more than one engine is tested, average the results and round to the same number of decimal places contained in the applicable standard, expressed to one additional significant figure."

Letters:

Commenter	Document #
OPEI	0675
EMA	0691
Kohler	0703

Our Response:

We require manufacturers to submit emission results for CO_2 only where those measurements are needed to determine emission levels of regulated pollutants. If this information is routinely gathered as part of emission testing, there is a minimal reporting burden for manufacturers. We want to be able to access this information to help us assess the reported results for the regulated pollutants. We have revised the regulation to clarify that these results should be reported as brake-specific values (g/kW-hr).

We believe that the branding provisions of §1054.640 include basic information necessary for ensuring that equipment manufacturers will fulfill their warranty obligations. We agree that we can omit the requirement for engine manufacturers to describe the specific arrangements in their application for certification, but we believe it is necessary for the engine manufacturer to formalize the arrangements in the form of a contractual obligation, and it is quite appropriate to inform us of all the equipment manufacturers with whom this relationship exists.

The references to THC and THCE are simply given as examples, so there is no need to include NMHC as another example. However, it is not incorrect, so we have modified the regulation accordingly.

We agree with the commenter that installation instructions should be focused on ensuring that engines are in their certified configuration after installation in equipment. Our proposed regulation included several specific details, such as referencing altitude specifications where appropriate, clarifying information related to evaporative emission controls, describing limits on installations (such as being certified only for use in rated-speed applications), and adding a note that duplicate labels may be necessary. The proposed provisions are well established in many of our other programs and they include only as much as we believe is necessary to achieve the commenters stated goal of ensuring that engines are in their certified configuration in the final installation.

We agree with manufacturers that submitting production reports within 45 days after the end of the model year is sufficient.

If it becomes clear that defective engines are limited to production processes or other practices at a particular production facility, both we and the manufacturer would want to understand how isolated the problem is. This would apply both for applying a remedy and assessing penalties, if appropriate. We believe manufacturers should be keeping these records as a matter of course for business reasons, so we expect there is no additional burden to keep this information. If production is divided into multiple steps across multiple facilities, manufacturers should still be able to identify the number of engines that were processed at each facility.

EMA's concerns about certifying fuel lines under §90.127 are moot because we are revising these requirements to apply to component manufacturers.

We agree that EPA's process for approving certification and testing procedures should be transparent. However, we believe the best approach for accomplishing this is administratively rather than by regulation. We may develop a process consistent with Kohler's suggested approach, but we need to maintain the flexibility to develop and modify those processes based on our continuing experiences rather than limiting ourselves to a specific approach in the regulation. We look forward to working with manufacturers over time to continue to improve our processes for evaluating such requests and communicating the results of this decision-making.

2.5 Test procedures

2.5.1 NHH duty cycle/governor

Comment	Response
EMA commented that the NPRM's requirement that engines operate utilizing the engine's installed governor for the idle mode is not appropriate for many engines. A significant percentage of engines in the Small SI category do not utilize the engine governor to control speed at idle. Such engines utilize a fixed throttle position, generally determined by an adjustment screw. For engines that do not utilize the governor to control idle speed, the test condition should represent the expected in-use idle speed control condition rather than the governor.	We agree that the regulations should reflect the situation in which no engines in the family have governors that control idle speed. The definitions and testing provisions in part 1054 and part 1065 specify that engines without governors controlling idle speed should be set at the idle speed declared by the manufacturer.
§1054.235(c)(4). EMA commented that it is impractical to recalibrate an emission test engine within normal production tolerances as described in this section. §1054.235(a) requires the test engine to be selected based on the identified criteria and to be "tested as they will be produced". Artificial modification via recalibration is an overly broad requirement that should not be granted to EPA to use in its discretion. EMA commented that this provision should be deleted.	The proposed provision is limited to items that are not considered adjustable parameters. As noted in the definition of the term, this might include adjustments that are not emission-related or that manufacturers ask us to exclude. To the extent that production tolerances allow for varying engine settings, these items should be subject to calibration settings such that the testing configuration represents the full range for in-use engines. This provision is already in place under

	§90.119(b)(2)(iii).
§1054.501(b)(1). The reference to engines without throttle control is confusing and inappropriate. As properly defined elsewhere in the proposed rule, the engines in this category are generally considered constant speed engines for emission testing purposes. Engines in this category can have a wide variety of controls including: (i) no user control of speed, (ii) user control of the maximum speed, and (iii) load sensitive automatic idle speed. EMA commented that this section should be revised to eliminate the first portion of the second sentence that it reads as follows: "See 40 CFR Part 1065.10 for instructions for using alternate procedures if utilizing the procedure specified in 1054.505 would result in emissions that do not represent in-use emissions."	We agree that the provisions in question are best addressed elsewhere. We have removed the text in question from §1054.501(b)(1). See §1054.650 for provisions related to certifying engines without governors or with variable-speed governors.
§1054.501(b)(3). EMA commented that the proposal disallowed correcting emissions for the effects of humidity. EMA commented that this restriction is not consistent with EPA's current requirements as set forth in §90.419. Many laboratories do not have EPA's ability to run at a controlled humidity. Accordingly, EMA commented that the humidity correction factor for NOx emissions calculated per §1065.670 should be required for a valid emission test.	We agree that the humidity correction in §1065.670 is appropriate for Small SI engines. We have revised the regulations accordingly.
§1054.501(d). EMA commented that engine manufacturers must be allowed to use good engineering judgment in order to determine engine changes associated with the prescribed emission test temperature. The ambient emission test conditions are not representative of in-use conditions for winter exclusive products, but ambient test conditions cannot be achieved in the test environment that equate to in-use conditions. For example, winter exclusive engines cannot operate in the prescribed emission test conditions without removal or modification of air intake heating systems such that intake air temperature during the emission test is representative of intake air temperature when the engine is operated in-use. EMA recommended that the following be added: Engines may be modified for emission testing such that intake temperatures are analogous to in-use conditions.	We agree that manufacturers should be allowed to remove intake air heaters when testing wintertime engines at temperatures between 20 and 30°C and have modified the regulations accordingly. We have also added a provision allowing manufacturers to test wintertime engines at reduced ambient temperatures by referencing the existing specifications for snowmobiles in §1051.505. In addition, we are adding language to §1054.501 to say that non-wintertime engines should be tested in a way that properly simulates in-use intake air temperatures. We want to avoid a situation where manufacturers cool the intake air after it has warmed up from exposure to engine heating. This is clearly not appropriate since that type of cooling does not occur during in-use operation.
§1054.505(a)(1). EMA commented that the reference to 40 CFR Part 1065.514 must clarify that these engines are considered constant speed engines pursuant to §1054.505(b) and therefore only torque statistics are required.	We agree that the reference to §1065.514 should be limited to torque-related measurements. There are certain modes where manufacturers must control speed within certain bounds, but these are specified separately in §1054.505.
§1054.505(c)(2). EMA commented that if EPA does not accept our proposed revisions to §1054.801 (see comments in Section 2.5.3 below), this section must be revised in order to delete the phrase "maximum test torque" and replace it with the following language "full-load torque value from **§**1054.505(d)(2)."	We agree that §1054.505(c)(2) should reference §1054.505(d)(2) for the appropriate torque value, rather than relying on maximum test torque as defined in §1065.1001.

Letters:

Commenter	Document #
EMA	0691

2.5.2 HH duty cycle/governor

What Commenters Said:

OPEI commented that Max power, as defined in 1054.801 and in 1065.601, are in conflict. OPEI commented that EPA needs to make clear that the power from 1054 applies for handheld products during the cert test.

Letters:

Commenter	Document #
OPEI	0675

Our Response:

The regulations specify that maximum engine power is used only for determining whether engines are subject to part 1054 requirements or not. Engines are tested based on the procedures specified in part 1054, subpart F (including Appendix II), which clarify the load settings for full-load operation during the emission test. There are no power definitions or specifications in §1065.601, but the other places where there are power specifications in part 1065 (such as engine mapping in §1065.510) do not apply for handheld engines.

2.5.3 Maximum test speed

What Commenters Said:

OPEI agreed with the reasoning EPA presented for an improved basis in selecting an appropriate wide-open throttle speed for emission testing. OPEI believes though that EPA may be unnecessarily complicating the regulation with its current language. Handheld products such as chain saws, trimmers, brushcutters, edger and hedge clippers (not inclusive) run at wide-open throttle speeds in the field that may vary depending on application and load. For example a chain saw may be used for debranching, bucking or felling. All which may have slightly different loads and resulting speeds. It can be said that these product types will always be operating around the max power point but this could vary by several hundred rpm.

Product that always operates at a fixed speed due to the load of the transmission device (like a power blower, pump or generator) should always be tested at the actual operating speed in field conditions to get the best real world emission test results. OPEI suggested that the definition for rated speed at wide-open-throttle for handheld products be revised as follows: 1) Products that always operate at a fixed speed due to the natural load placed on the engine (such as power blowers and pumps) should be tested at the real world operating speed, in the configuration intended for use by the manufacturer, (+/- 350 rpm). 2) For all other handheld products (like clippers, trimmers chain saws, edgers etc), the emission test at wide-open throttle should be performed at the point of peak engine power (+/- 350 rpm).

EMA commented on two of the definitions set forth in §1054.801: 1) Maximum test speed: The reference should not be to 40 CFR Part 1065.1001, but rather to 40 CFR Part 1054.505. 2) Maximum test torque: The reference should not be 40 CFR Part 1065.1001, but rather to 40 CFR Part 1054.505.

Letters:

Commenter	Document #
OPEI	0675
EMA	0691

Our Response:

We believe ungoverned handheld engines should be tested at speeds representing the most likely in-use operating speed. We agree with OPEI's suggested approach for identifying the nominal test speed for engines based on whether or not they will be operating in a fixed-speed application.

We use the term "maximum test speed" in part 1054 only to describe how to test governed handheld engines over the two-mode handheld duty cycle. We believe this broadly applicable method from part 1065 is appropriate for testing these engines and are therefore retaining the definition as proposed.

We have revised the regulation to avoid using the term "maximum test torque," since the meaning of this term from part 1065 does not apply to Small SI engines.

2.5.4 Test fuel

What Commenters Said:

OPEI, EMA and Briggs and Stratton commented that California Phase 2 Certification fuel should be allowed with EPA approved adjustment factors for Phase 2 nonhandheld engines as currently practiced for Phase 2 engines. Specifically, OPEI commented that the statement in §1054.501(b)(2) should be revised to reflect: "use commercially available fuel representative of the fuel that in-use engines would use in the same environmental conditions as the test is conducted. Use of CARB Phase 2 fuel is considered acceptable." EMA commented on §1054.501(b)(2) "How do I run a valid emission test?" EPA should explicitly state that California Phase 2 Certification fuel may be used with EPA approved adjustment factors as currently practiced for Phase 2 engines. Briggs and Stratton added that the proposal does not allow for the use of oxygenated fuel, which would include California Phase 2 Certification fuel. Alternative test fuels should continue to be allowed. Requiring a change would impose a burden on many engine manufacturers with no benefit.

OPEI's and EMA's engine manufacturers proposed that appropriate correction factors be developed if the EPA certification test fuel is changed to an oxygenated fuel. Currently EPA allows an option for engine manufacturers to use California certification test fuel which is an oxygenated fuel for exhaust emission testing with an appropriate adjustment factor for the emission results reported. OPEI's engine manufacturers recommended that a standard adjustment factor for 50 state correlation (CARB/EPA) be included in the final regulation. EMA added that the emission adjustment factors should be defined either in the regulatory text or in guidance such that all manufacturers can utilize the same approved adjustments.

With regard to handheld engines, OPEI also supported alignment of EPA certification fuel with the California certification fuel because the type of fuel may directly influence the results of any testing and the ability of manufacturers to confirm that technologies evaluated are in fact compliant with the proposed regulations. However, the means to achieve this alignment needs to be flexible. OPEI proposed allowing the use of CARB certification fuel for handheld engine exhaust emission testing without the need for correlation factors. OPEI requested that different approaches to the solution should be considered for 2-stroke and 4-stroke engines since the emissions are different.

OPEI commented that EPA should harmonize the fuel for exhaust and evaporative emission testing because the same fuel can represent real world conditions in the field. EPA should accept a ten percent ethanol blend fuel as the standard test fuel for engines without changing the limits. If a manufacturer certifies with the ten percent ethanol blend fuel, OPEI commented that EPA should use the same fuel for any SEA or in-use testing conducted.

Letters:

Commenter	Document #
OPEI	0675
Briggs and Stratton	0657
EMA	0691

Our Response:

We are requiring Phase 3 exhaust emission testing with a standard test fuel consistent with the existing requirements under 40 CFR part 90 (see 40 CFR part 1065, subpart H). The existing regulatory specifications allow for no oxygenates in the test fuel. Because CARB specifies a test fuel which contains the oxygenate MTBE (but also allows for the use of EPA's test fuel), we understand that some engine manufacturers will have emissions data from engines which meet EPA's Phase 3 standards based on testing to meet California's Tier 3 Small Off-Road Engine requirements for 2007 and later model years. In some cases this test data will be based on California's oxygenated test fuel, although manufacturers have the option to certify using a test fuel such as that specified by EPA in 40 CFR Part 90. To allow for a quicker transition to the new EPA standards, we will allow for use of this pre-existing exhaust emission test data (based on California's oxygenated test fuel) for EPA certification purposes through the 2012 model year (see §1054.145(k)). Manufacturers could also use the CARB test fuel for their PLT testing, if they based their certification on that fuel. The use of the CARB data would be subject to the provisions for carryover data for demonstrating compliance with the standards in effect. (The carryover provisions for Phase 3 are specified in §1054.235(d) of the regulations.)

While we will allow use of this CARB data for certification through the 2012 model year, we will use our test fuel without oxygenates for all confirmatory testing we perform for exhaust emissions. We are limiting the timeframe for such a provision because we ultimately want the exhaust emission test results to be on the EPA specified test fuel.

After the 2012 model year, a manufacturer wanting to use the CARB test fuel for certification purposes could request use of the CARB test fuel under the provisions of 40 CFR 1065.701(b) which apply for alternate fuel specifications. As part of that request, the manufacturer is required to show that use of the alternate test fuel will not affect the ability to demonstrate compliance with all applicable emission standards. We would expect this showing should be straightforward for handheld engines, where we are not changing the exhaust emission standards for Phase 3 and where many manufacturers are already using CARB test fuel and should already be taking any emissions difference into account when certifying their engines. For nonhandheld engines, where we are changing the exhaust standards for Phase 3, we would expect to see emissions data showing the impact of the alternate fuel on emissions (compared to EPA's standard test fuel) as part of the manufacturer's request to use an alternate fuel under 40 CFR 1065.701(b). While we may allow use of alternate test fuels such as the CARB test fuel after the 2012 model year, we will use our test fuel without oxygenates for all confirmatory testing we perform for exhaust emissions. Furthermore, because of the differences in engine technologies, we do not believe it is appropriate for us to establish an "adjustment factor" for CARB certification fuel or any other potential alternate fuel. Each manufacturer would need to determine the emissions impact of the alternate fuel for its specific engine designs.

In the proposal we noted our concerns about testing with oxygenated fuels since this could affect an engine's air-fuel ratio, which in turn could affect the engine's combustion and emission characteristics. Because of the relatively recent dramatic increase in the use of ethanol (another oxygenate) in the broad motor gasoline pool, we have reexamined our position (as discussed below) and are adopting provisions that will allow manufacturers to use a 10 percent ethanol blend for certification testing for exhaust emissions from nonhandheld engines, as an alternative to the standard test fuel. This option to use a 10 percent ethanol blend will begin with the implementation date of the Phase 3 exhaust standards. The option would apply to production-line testing as well if the manufacturer based their certification on the 10 percent ethanol blend. We are also committing to using a 10 percent ethanol blend for all confirmatory testing we perform for exhaust emissions under the provisions described below.

Ethanol has been blended into in-use gasoline for many years, and until as recently as 2005, was used in less than one-third of the national gasoline pool. However, ethanol use has been increasing in recent years and, under provisions of the Energy Independence and Security Act of 2007, ethanol will be required in significantly greater quantities. We project that potentially 80 percent of the national gasoline pool will contain ethanol by 2010, making ethanol blends up to 10 percent the de facto in-use fuel. As ethanol blends become the primary in-use fuel, we believe it makes sense for manufacturers to optimize their engine designs with regard to emissions, performance, and durability on such a fuel. We also believe manufacturers need to know that any confirmatory testing we do on their engines will be performed on the same fuel the manufacturer used for certification since the fuel can impact the ability to demonstrate compliance with the emission standards.

Limited data of nonhandheld engine emissions tested on 10 percent ethanol blends suggests the HC emissions will decrease and NOx emissions will increase compared to emissions from the same engine operated on current certification fuel without oxygenates. Depending on the relative HC and NOx levels of the engines, these offsetting effects can result in small increases or decreases in total HC+NOx emission levels. Because the impact on HC+NOx emissions can vary slightly from engine family to engine family, we do not want manufacturers varying their certification fuel from one family to another to gain advantage with regard to emissions certification.

Therefore, if a manufacturer wishes to use a 10 percent ethanol blend for certification, we are adopting provisions that require manufacturers to use the 10 percent ethanol blend for all of their Phase 3 nonhandheld engines for a given engine class within three years of the Phase 3 standard taking effect (i.e., by the 2014 model year for Class I engines and by the 2013 model year for Class II engines). During the transition period, we will perform any confirmatory testing on the 10 percent ethanol blend if that is the fuel used by the manufacturer for certification. At the end of the transition period, we will perform any confirmatory testing on the 10 percent ethanol blend if that is the fuel used by the manufacturer for certification, but only if the manufacturer has certified all of their nonhandheld engines in that engine class on the 10 percent ethanol blend. If the manufacturer has not certified all of its engines in a given engine class on the 10 percent ethanol blend, we could decide to test the engine on our current test fuel without oxygenates.

For handheld engines, where we do not have sufficient data on the impact of ethanol blends on emissions, we are adopting a slightly different approach. Manufacturers will have the option to use a 10 percent ethanol blend for certification beginning with the 2010 model year. The option to use a 10 percent ethanol blend would apply to PLT testing as well if the manufacturer based their certification on the 10 percent ethanol blend. While we will allow use of a 10 percent ethanol blend for certification, we expect to use our test fuel without oxygenates for all confirmatory testing for exhaust emissions. Therefore, an engine manufacturer will want to consider the impacts of ethanol on emissions in evaluating the compliance margin for the standard, or in setting the FEL for the engine family if it is participating in the ABT program. We could decide at our own discretion to do exhaust emissions testing using a 10 percent ethanol blend if the manufacturer certified on that fuel. It can be noted that both EPA and CARB are currently running test programs to look at the emission impacts of a 10 percent ethanol blend on a range of small SI engines, including handheld engines. Based on the results of that test program, we may want to consider changes to the provisions allowing the use of a 10 percent ethanol blend for certification and PLT testing for handheld engines. If the results of the handheld engine testing show that emissions are comparable on both fuels, we would expect to revise the provisions for handheld engines and adopt similar requirements to those adopted for nonhandheld engines as noted above.

The test fuel specifications for the 10 percent ethanol blend are based on using the current gasoline test fuel and adding fuel-grade ethanol until the blended fuel contains 10 percent ethanol by volume. It should be noted that this is the first time EPA regulations specify the use of an ethanol test fuel for exhaust emissions testing for certification purposes. It is likely that EPA will consider similar test fuel changes in the future for other vehicle and engine categories including those addressed in this final rule. As part of those deliberations, it is possible that EPA could decide that the test fuel specifications for the ethanol blend should be different than those adopted in this rule. Should that occur, EPA would need to consider whether changes to the test fuel specifications adopted in this rule for the 10 percent ethanol blend are appropriate for nonhandheld engine testing.

2.5.5 1065 Issues for Small SI Engines

Comments were received from industry and industry organizations on several issues relating to the application of Part 1065 to Small SI engines. This section describes issues that are specific to Small SI engines. See Section 1.4 for more general issues raised by commenters related to engine testing under Part 1065.

What Commenters Said:

In the proposal and in its administrative record, EPA has not clearly identified, much less evaluated, all the potential impacts that could occur by replacing the Part 90 exhaust emission test procedures for small-spark-ignited engines with the generic Part 1065 exhaust emission test procedures. The 1065 test procedures were developed for very different types of much larger and more sophisticated engines. OPEI stated that its members are committed to working with EPA to fill the critical data gaps. However, there is no way EPA or industry could generate all the needed information in the next few months, complete this evaluation, and make all the needed improvements – before the final Phase 3 rulemaking must be issued. For these reasons (which are discussed in more detail below), EPA should allow (on a permanent basis) small engine exhaust testing at facilities that use equipment and procedures that are compliant with the existing Part 90 equipment, procedures and calculations.

1. Equation Calculations: Kohler, B&S and OPEI stated that Part 1065 should not be implemented until correlation between Part 90 and Part 1065 (subsection G) calculations have been adequately demonstrated (documented, correlates and validates). Before eliminating or making any changes to the well-established Part 90 test procedures, EPA should first conduct comparative testing, and identify and analyze all the impacts of shifting to Part 1065. Industry has developed a database of information with part 90 over the past 10 years. The proposed changes to calculate emissions on Part 1065 are confusing and jumbled. Simple spreadsheet calculation methods are now impossible and a program dedicated to an iterative solution is required. There is no data in the record to show the proposed test method would yield the same results. If the correlations are not completed, the manufacturers of Small SI engines must be allowed to continue to use the 40 CFR Part 90 calculation methods.

   Specifically, OPEI stated that virtually all small SI engines operate richer than stoichiometry and the majority of testing is conducted using raw gas sampling methods. Consequently, the applicability of the equations for raw gas emission measurement for engines with air/fuel ratios richer than stoichiometric are critical. Part 1065 prescribes equations associated with the conversion of the raw analyzer measurements to the mass equivalent. Much more measured data (like H2O, N2O, aldehydes) would be needed to prove the equivalence of the 1065 calculation on a theoretical (mass balance of O, C, N,

H) and practical bases. Differences in exhaust sampling systems may affect these chemical reactions/equilibrium and thereby the exhaust gas composition and measured values. It is a well known effect that hydrocarbons are converted to CO at high temperatures (post catalyst). Probes, sampling location, temperatures and flow rates all have a potential effect to change the measured values within a raw gas measurement.

2. Test fuels: In addition, the test fuel specifications in Part 1065 are different than existing Part 90 fuel specifications which could also result in skewed, different reported emissions. Part 1065 does not include any specification that addresses the 2-stroke oil-grade and mixing ratio. (See 40 CFR S. 90.308). (OPEI)

   Test methods: Before eliminating Part 90 as an option for test equipment, EPA would first need to resolve numerous outstanding issues, make needed modifications, and document that Part 1065 requirements can be practically implemented with small engines.

3. Fuel flow meter issues: a) the accuracy prescribed by §1065.205 may be impossible to meet for small engine test cells. Current known instruments will nominally meet the 2% accuracy and 1% repeatability values specified in Part 90, but may not meet the percentage of maximum or the percentage of point requirements specified in Table 1 of 1065.205. b) Linearity verification for fuel flow rates ≤1% (under §1065.307) are not feasible for small engines with low fuel flow rates. c) Lastly, a concern expressed was that the wide open fuel flows of today's Part 1065 engines may reach as much as 50 liter/hour whereas Small SI engines frequently do not exceed 0.5 liters/hour. (Industyr representatives later indicated that these points were meant to raise the issue that the tolerances in these sections are not yet known to be achievable.)

4. The requirement to control torque as needed to meet 40 CFR Part 1065.514 cycle-validation criteria may not be feasible for test modes with very low target set points. Currently, 40 CFR Part 90.410 includes a provision for Phase II testing that reads as follows: "hold the specified load within the larger range provided by ±0.27 Nm (±0.2 lb-ft), or ±ten (10) percent of point" for current Phase 2 engine testing. EPA must include a similar provision applicable to the testing of engines with modes where torque set points result in impractical cycle validation, as prescribed by §1065.514. (EMA) The comments also stated a concern that the torque transducers called for in Part 1065 today would measure up to hundreds of joules of torque whereas the transducer used for engines specified in Part 90 measure in the range of tenths of joules. The characteristic of these engines requires a transducer to handle high torque spikes yet, measure smaller torque ranges once the engine stabilizes. (OPEI)

5. Part 1065 analyzers which are designed for larger engine emission measurements might not be practical or suitable for long-term emission measurements on small SI engines – at least without substantial modifications. For example, the HC hang-up specifications (2 ppm) in S. 1065.520 are impractical for the much higher HC emission concentrations measured on rich burn gasoline sampling raw gas concentrations.

6. The ambient conditions defined by 40 CFR Part 1065.520 are different than the conditions prescribed by §1054.115(c). Specifically, the ambient pressure range specified in §1065.520 is a range from 80.0-103.325 kPa; and the pressure range specified in §1054.115(c) is 94.0-103.325 kPa. The Part 1065 ambient condition requirements should be clarified in order to provide that the general requirements prescribed in Part 1065 are pre-empted by the standard setting Part. (EMA)

7. The NPRM does not allow exhaust emission test results to be adjusted in order to account for the effect of ambient humidity. However, NOx emissions test data is currently corrected for humidity pursuant to 40 CFR Part 90.419. Because many laboratories do not have the ability to run at controlled humidity (as EPA can), such corrections are often significant. The final regulation must allow the correction of emission test results for humidity as currently prescribed by § 90.419 (and utilized by CARB). (EMA)

OTHER:

8. Based on the limited information that EPA has provided, it is difficult for OPEI to comment on all the ramifications of this proposed change. However, it appears that the Part 1065 test procedures could cause small engine manufacturers to spend hundreds of thousands of dollars on at least new calibrations and software with no environmental benefits. The cost estimate of equipment upgrades will be as much as $500,000 per test cell with no real benefit to emissions. (OPEI)

9. EPA has also not identified how a shift to the Part 1065 test procedures would impact small engine manufacturers in terms of replacing or modifying their existing Part 90-compliant test equipment and related software and calibrations.

10. Manufacturers noted that some manufacturers control engines at idle by setting the dynamometer to control engine speed and use operator demand to control torque (usually zero, but not always), while other manufacturers take the opposite approach.

11. Given numerous uncertainties, the application of Part 1065 could result in more stringent exhaust standards. At least for handheld manufacturers, the Part 1065 test procedures could also unintentionally result in more stringent exhaust standards. To avoid these unintended consequences, EPA should allow small engine manufacturers to continue to rely on the Part 90 test procedures, which could simply be referenced in the new Part 1065. (OPEI) In its Phase 3 proposal, EPA repeatedly indicated it would not change the stringency of the Phase 2, exhaust standards for Handheld (HH) products. The Phase II exhaust standards for HH engines are exclusively based on data generated from Part 90 test equipment. EPA's proposal and supporting administrative record do not evaluate whether, or to what extent, the application of the Part 1065 requirements and calculations could generate higher reported emissions from small engines (compared to Part 90) – unintentionally resulting in more stringent standards than are supported by EPA's record.

12. The requirement to submit a written report explaining reasons for invalidating any test and the need for EPA to authorize retesting is overly broad and requires clarification.

There is no need for EPA to authorize common causes for clearly invalid tests, such as invalid pre- or post- span measurements, etc. The requirement to submit the test result from an invalid test is acceptable provided EPA recognizes that in some cases the reason that the test is invalid will result in erroneous results that should not be used for any purpose. (EMA)

13. OPEI stated some members have recently purchased Part 1065-compliant analyzers and equipment in other industry segments based on their reliance on EPA's proposal that they would be able (as an option) to start certifying products with this equipment immediately. OPEI supports EPA's proposed approach to allow (as an option) certification testing using Part 1065-compliant equipment.

14. TIMING: At this stage in the rulemaking, there is inadequate time and resources for EPA and the affected stakeholders (including test equipment suppliers) to gather the needed information and then to develop proposed tailored solutions and regulatory modification to address all the unresolved issues. There is no way EPA could issue a final regulation in June 2008 that would address all these problems with the needed modifications for small engines.

15. Part 1065 Test Procedures would Create Discriminatory Trade Barriers

The U.S. EPA proposed test equipment changes would contradict the agreed-to goals of standards-harmonization and, in certain circumstances, could create a barrier to trade. CARB and the EU emissions regulations for small engines are based on the Part 90 procedures. As indicated in CARB comments into EPA's Phase III rulemaking, CARB may not accept certification data from Part 1065 test equipment for small engines. CARB remains concerned that Part 1065 equipment will not generate the same results as Part 90 test equipment for small engines. In a call on January 23, 2008, CARB's certification office confirmed that CARB will not generically accept certification test data on small engines based on Part 1065 test results because of the absence of any existing database that generically documents the equivalency of Part 1065 and Part 90 test procedures as applied to small engines. Consequently, CARB will require individual manufacturers to demonstrate complete and identical test equivalency on their proposed test equipment through a comprehensive CARB-approved test plan. To our knowledge, no small engine manufacturer has made such a demonstration to CARB's satisfaction. We expect other jurisdictions, including the EU, to adopt a similar position and refuse to accept Part 1065 test results for small engine certification in the absence of a comprehensive demonstration of equivalency. Such demonstrations will be very difficult to prove. Even after expending substantial resources to try and establish such an equivalency, it is uncertain whether individual manufacturers' test equipment will meet CARB's and the EU's requirements.

Other major countries, including China, are developing regulations that are primarily based on the EU regulations and the related Part 90 testing procedures. EPA's proposed, unilateral changes to these test procedures would force at least European and Asian small engine manufacturers (that need to produce uniform products for the global market) to spend millions of dollars to purchase, install and calibrate separate analyzers, software, and instrumentation (and invest in additional personnel) to re-test dozens of different, emission-compliant, engine families that are exported to the U.S. market.

A disproportionate cost burden would be born by smaller and mid-size European and Asian manufacturers that typically manufacture and certify small volume or “niche” products for the U.S. market. In fact, the higher per-unit costs of U.S. EPA certification-testing could bar small volume European and Asian producers from being able to compete and sell niche products in the U.S. market. For example, smaller manufacturers with only a few test cells would likely incur at least $300,000 in additional costs in modifying their test cells in order to test and certify (with EPA) their US products under the Part 1065 procedures. Assuming a 5-year amortization, this would result (on average) in $73,000 in additional testing costs per year. Many of the affected niche product lines produced by European and Asian manufacturers consist of only 1,000 units in U.S. sales each year. For such products, European and Asian manufacturers would incur additional, amortized testing costs in the range of $73 per unit for niche lawn and garden product lines that typically sell for less than $300 per unit. Thus, the U.S. EPA’s proposed “Part 1065” test procedures could create discriminatory trade barriers that unfairly discriminate against the niche products and low-volume manufacturers and would require them to invest in expensive and redundant emission test equipment.

Euromot also stated that the changes in the test procedures as proposed by introducing §1065 would generate a misalignment with present equipment and worldwide harmonized procedures and would not generate additional value to the US customers. Euromot therefore asks EPA to stay with the current part 90 test procedures.

On March 19, 2008 Euromot sent a followup letter to their comments on the NPRM and stated that in the final Phase 3 rule, EPA should 1) continue to apply harmonized Part 90 Test procedures to small spark-ignited engines; and 2) Commit to initiate a process to develop Global Technical Regulation (GTR) with the coordinated participation of the EU and other international stakeholders (including Euromot) to develop new test procedures that are specifically tailored to the unique challenges of small spark ignition engines.

Stihl further emphasized their interest in cooperating with EPA in an effort to develop a Global Technical Regulation. They noted that Euromot’s goal is a very precise test method that does not give flexibility towards "creative" test results, rather than leaving specifications that are too general to serve as a practical instruction for companies that may be inclined to cut corners in their testing efforts.

Letters:

Commenter	Document #
OPEI	0675
OPEI	0752
Euromot	0649
Euromot	0766
Kohler	0703
Briggs and Stratton	0657
EMA	0691
Stihl	0784

Our Responses:

Before addressing the specific comments, it is important to note that since the time of the NPRM, we have made changes to part 1065 in a separate rulemaking that also set new emission standards for locomotives and marine diesel engines (73 FR 37096, June 30, 2008). As described below, several of these changes address comments that we received on this rule.

1. *Equation Calculations – correlation needed, else allow manufacturers to use Part 90.*

Industry commented that correlation between Part 90 and Part 1065 calculations has not adequately been demonstrated for these classes of engines. EMA, B&S, OPEI, Kohler stated part 1065 not be implemented until it is shown 1065 and 90 are equivalent for raw gas measurements.

In response to comments, we have conducted a thorough comparison of the part 90 and part 1065 calculations.[1] Our initial analysis show small but significant differences between the two methods. Some of the initial differences are being eliminated through changes to the part 1065 equations as described below. Others that are the result of errors in the part 90 calculations are not being eliminated. Calculations from the modified part 1065 equations and from the part 90 equations for handheld engines are presented below. The table below shows the differences between the Part 90 and Part 1065 data sets with Part 1065 calculations yielding lower emission results for HC and overall HC+NOx. Existing data can be recalculated or adjusted to be comparable to part 1065 results.

[1] In January/February of 2008, EPA shared correlated data with the nonhandheld and handheld industries based on industry submitted data.

Percent difference between emissions calculated using part 90 versus part 1065 equations (Negative values indicate that values calculated according to 1065 are lower than those calculated according to 90.)				
	HH	HH	NHH	NHH
	Raw*	CVS	Test 1	Test 2**
HC	-2.51%	-2.78%	-2.19%	-2.28%
NOx	0.29%	-0.13%	0.41%	0.32%
CO	0.23%	0.28%	0.22%	0.21%

* Errors were found in the currently published Part 90 calculations and are being corrected with this final rulemaking.
** An error was found in the industry K_h calculation related to nonhandheld engines for Test #2; it was corrected and comparison to 1065 was based on the corrected numbers.

As part of the exercise to compare calculated emission results, we determined that it was necessary to account for free hydrogen in the exhaust as part of the carbon balance. This is particularly important for engines that run rich of stoichiometry because of the greater concentration of hydrogen formation with such engines. For engines that have already been subject to testing under Part 1065 using the old equations, calculating based on a zero concentration of hydrogen in the exhaust is a reasonable simplifying assumption. We have modified the Part 1065 equations in this rule to reflect the need to account for hydrogen in the exhaust for engines that run rich of stoichiometry. The hydrogen values can be calculated and need not be measured by an analyzer.

2. *Specifications for 2-stroke oil grade and mixing ratio will be considered. Specifications for test fuels will be evaluated and considered.*

In response to comments, EPA is adding 2-stroke oil grade and mixing ratio specification to part 1065 in subpart H. The new language is being taken from §90.308(a)(1), which states that the fuel/oil mixture ratio must be that which is recommended by the manufacturer for the 2-stroke engines.

3. *Fuel flow meter issues*

Regarding measurement of fuel flow rates, the equipment for measuring fuel flow rates so precisely may not currently be in use by all in industry. Currently part 90 states that test points are to come within, 2% at non-idle and 5% at idle of the reading. According to the 1065 requirements for the calibration of the fuel flow meter, the engine manufacturers must test 10 points over the range of fuel measurement expected during the entire test. The verification tests then apply to this linear line and calibrations of the system are to be done. For a handheld engine the certification test uses only two test points during its test and may use 0-6lb/hr for example. The two modes are at WOT and idle and therefore the in between points are never used. For a nonhandheld engine that used 0-3 lb/hr, a reading must be taken every 0.33 lb/hr and there are 6 modes in the certification test. Industry does not yet know if fuel flow measurement equipment is available to read to this degree and does not see the need for this precision for neither of these test procedures are transient.

EPA would like to ensure linearity of the fuel flow meter within the range of testing. This cannot be a simple two point verification, but needs to include enough points to insure linearity between the maximum and minimum fuel flow rates. This check only needs to be performed yearly; therefore EPA would like the small handheld engine manufacturers to perform the fuel flow meter linearity verification check as currently described in 1065.307.

One possible solution is to use gravimetric technology as long as the linearity specifications in 1065 are met.

Table 1: Comparison of Requirements for Fuel Flows

Fuel Flows	**Part 90**	**Part 1065**
Fuel flow meter specs	90.328: Measurement equipment accuracy/calibration frequency table. Table 2: Permissible deviation from reading: fuel consumption: +/-2% at non-idle +/-5% idle	(Recommendation) : Table 1 of 1065.205 5 sec rise and fall time 1Hz Accuracy: 2% of pt/1.5% of max Max repeatability: 1% pt/.75% max Noise .5%
Linear Verification	None…	Linear verification 1065.307 - 10 measurement points covering range of test meas. - least squares linear regression and the linearity criteria specified in Table 1 of this section.
Calibration and verify		1065.320
Frequency of Calibration	Calibrate monthly or within one month prior to the certification test.	Measurement systems that require linearity verifications … Torque and Fuel Flow: Within 370 days before testing

4. *Torque related issues*

As industry works with 1065 over the coming years, we expect to work with industry to understand how to properly measure torque. In particular, we believe it is possible to use equipment meeting the torque requirements for testing Small SI engines, even at the low torque levels that are typical for these engines. We have modified the cycle-validation criteria for torque as described in Section 2.5.7 to more carefully reflect the level of precision that is appropriate for Small SI engines.

EPA would like to ensure linearity of the torque meter within the range of testing. This cannot be a simple two point verification, but needs to include enough points to insure linearity between the maximum and minimum torque values. This check only needs to be performed yearly; therefore EPA would like the small handheld engine manufacturers to perform the torque meter linearity verification check as currently described in §1065.307.

Table 2: Comparison of Requirements for Torque Transducers

Torque Transducers	**Part 90**	**Part 1065**
Calibration procedures	90.305 Dynamometer specifications and calibration accuracy … a minimum of **three** calibration weights for each range used is required. The weights must be equally spaced and traceable to within .5% of NIST weights. (foreign countries.. use wtd to local gov stds) 90.306 Dynamometer torque cell calibration Gives details on procedure	**§1065.307 Linearity verification.** (2) Engine torque. Use a series of calibration weights and a calibration lever arm to simulate engine torque. You may instead use the engine or dynamometer itself to generate a nominal torque that is measured by a reference load cell or proving ring in series with the torque-measurement system. In this case use the reference load cell measurement as the reference value. Refer to §1065.310 for a torque-calibration procedure similar to the linearity verification in this section. 1065.310: … Apply at least **six** calibration-weight combinations for each applicable torque-measuring range, spacing the weight quantities about equally over the range.
Calibration accuracy	90.306 dynamometer torque cell calibration Meas torque must be within 2% of calculated torque	Table 1 of §1065.307–Measurement systems that require linearity verifications.. specifications given for linearity
Calibration frequency	90.328 Measurement equipment accuracy/calibration frequency table. Torque: monthly or within one month prior to the certification test	Table 1 of §1065.307– Linearity for system (fuel flow rate and engine torque) – every 370 days 1065.310 Torque calibration. Calibrate all torque-measurement systems including dynamometer torque measurement transducers and systems upon initial installation and after major maintenance. Use good engineering judgment to repeat the calibration.

5.…The HC hang-up specifications (2 ppm) in S. 1065.520 are impractical for the much higher HC emission concentrations measured on rich burn gasoline sampling raw gas concentrations.

This language was changed in the locomotive/marine 2008 final rulemaking to address this concern.

6. The Part 1065 ambient condition requirements should be clarified in order to provide that the general requirements prescribed in Part 1065 are pre-empted by the standard setting Part. (EMA)

Section 1065.5 states "The testing specifications in the standard-setting part may differ from the specifications in this part. In cases where it is not possible to comply with both the standard-setting part and this part, you must comply with the specifications in the standard setting part. The standard-setting part may also allow you to deviate from the procedures of this part for other reasons." Thus the regulations are already clear in this respect.

7. EPA needs to allow for correction of ambient humidity 90.419 (also used by CARB). Industry does not have humidity controlled test cells.

Parts 1045 and 1054 are being revised to allow the correction of NOx for humidity. Equation 1065.670-1 calculates the correction. The 2006 version of Part 90 also refers to the same equation so there is no change in this calculation.

8. Based on the limited information that EPA has provided, it is difficult for OPEI to comment on all the ramifications of this proposed change. However, it appears that the Part 1065 test procedures could cause small engine manufacturers to spend hundreds of thousands of dollars on at least new calibrations and software with no environmental benefits. The cost estimate of equipment upgrades will be as much as $500,000 per test cell with no real benefit to emissions. (OPEI)

We disagree with the estimated cost and the supposition that upgrading to part 1065 will have no benefits. As described in the RIA, we believe that a typical manufacturer will need to spend much less than this to upgrade its test facilities to be part 1065 compliant. To the extent that any manufacturer needs to spend more, it will be because they are currently using outdated equipment that is not sufficiently accurate, precise, and/or reliable to demonstrate compliance with EPA standards. Clearly having more accurate and repeatable measurements is beneficial.

9. EPA has not identified how a shift to the Part 1065 test procedures would impact small engine manufacturers in terms of replacing or modifying their existing Part 90-compliant test equipment and related software and calibrations.

Industry does not have to certify with part 1065 procedures until 2013 and therefore time is available to meet with EPA on specific questions related to part 1065 compliance. With proper planning, industry can plan out any changes over time.

10. Testing at idle

We agree that manufacturers should be able to choose whether to use the dynamometer or operator demand to control speed and torque during idle operation. We understand that in some cases, once the engine is stable and the dynamometer controls are functioning, engines may be tested in a configuration such that the engine operates at the specified speed or torque level without adjustment.

11. Part 1065 could result in more stringent exhaust standards

The nonhandheld industry provided EPA with emission test data from two engine tests using raw emission measurement. The handheld industry provided EPA with one raw emission dataset and one CVS emission dataset. EPA verified industry's Part 90 calculations and then used the data to calculate results using 1065 calculations. In each case, the numbers correlated between Part 1065 and Part 90 within -2.3% of HC on nonhandheld test data and -2.78% HC on the handheld raw test data. In each case the 1065 calculations yielded lower numbers for the pollutant of THC due to the use of Part 1065's molecular weight of hydrocarbon default number rather than calculating it as was done in Part 90. The slight percentage decrease in effect yields slightly more lenient exhaust standards for the four datasets used in this analysis. Changes of up to 0.41% for NOx and 0.21 to 0.28% for CO are slightly more stringent standards for these pollutants in these examples.

The changes of <0.41% for NOx and <0.28% for CO on handheld and nonhandheld engines are very small changes. The NOx levels are very small on hh engines (test data showed 0.4%-0.8% of HC+NOx is NOx) and the emission standard for HC+NOx is either 50 g/kWhr or 72 g/kWhr, for Classes III, IV and Class V respectively. Therefore there is only a very slight increase in stringency in the standard. The handheld industry test results showed CO between 400 and 500 g/kWhr on the two sets of data for handheld engines. A 0.28% difference would mean an addition of approximately 1.12-1.4 g/kWhr. For nonhandheld engines, the overall change in HC+NOx was -1.7% and -1.6% for the two tests with the decrease in HC and the increase in NOx combined. For CO, test data shows the nonhandheld engines at 374 and 390 g/kWhr and 0.28% of these values are 1.05 and 1.09 respectively. This again is only a very slight increase.

12. The requirement to submit a written report explaining reasons for invalidating any test and the need for EPA to authorize retesting is overly broad and requires clarification. There is no need for EPA to authorize common causes for clearly invalid tests, such as invalid pre- or post-span measurements, etc. The requirement to submit the test result from an invalid test is acceptable provided EPA recognizes that in some cases the reason that the test is invalid will result in erroneous results that should not be used for any purpose.(EMA)

We agree that preapproval to retest after an invalid test is not necessary in most cases. However, it is necessary for invalid test results to be reported along with an explanation of why a test was invalidated. The revised regulations are also clear that we reserve the right to require preapproval of using retest results in PLT calculations should we determine that a manufacturer is inappropriately invalidating tests.

13. OPEI supports EPA allowing immediate certification with part 1065 compliant equipment.

Part 1065 allows for the early use of these procedures consistent with good engineering judgment.

14. Inadequate time and resources for EPA and the affected stakeholders to gather needed information and present tailored solutions and regulatory modification to address all unresolved issues.

The industry is not required to use part 1065 until 2013, which will allow over 4 years from the time of the final rule to modify the procedures. Also, the regulations in part 1065 include numerous provisions to provide manufacturers to use equivalent procedures. Thus we do not anticipate any problems associated with the timing of this requirement.

15. Part 1065 Test Procedures would Create Discriminatory Trade Barriers

In regards to the concern that CARB will not accept 1065 based certifications: CARB has been informed of Part 1065 along the way and will be adopting 1065 test procedures for small spark ignition engines.

Regarding the European Union adoption of 1065 procedures for small SI engines: it is likely that industry will begin proceedings for a GTR for small SI engines which will address 1065 requirements versus “may” options. The European community has already adopted 1065 for diesel engines.

Euromot stated that:“The changes in the test procedures as proposed by introducing §1065 would generate a misalignment with present equipment and worldwide harmonized procedures and would not generate additional value to the US customers. We therefore ask EPA to stay with the current §90 test procedures.”

EPA is moving to 1065 test procedures and is planning to take steps to work with the California Air Resources Board. EPA has also begun talks with industry representatives to discuss any issues related to testing small SI engines per part 1065. Part 90 is somewhat vague in several areas relating to emission testing procedure. Part 1065 provides guidance in those areas.

Euromot requested that EPA commit to initiate a process to develop Global Technical Regulation (GTR) with the coordinated participation of the EU and other international stakeholders (including Euromot) to develop new test procedures that are specifically tailored to the unique challenges of small spark-ignited engines.

EPA will continue to interact with manufacturers on issues that arise in complying with part 1065 as they work toward making any necessary changes to comply with the new test procedures starting with the 2013 model year. Given that the test procedures in part 1065 have been demonstrated to be complete and consistent with the existing procedures in part 90, EPA believes it is not necessary to initiate a Global Technical Regulation at this point. However, if there is an international or other forum for exploring testing issues for Small SI engines, EPA would expect to participate in that effort.

2.5.6 Running loss simulation during exhaust test

What Commenters Said:

OPEI commented that the influence of running loss vapor on exhaust emissions is insignificant and should not be associated with the exhaust emission testing requirement. It is impractical for an engine manufacturer to exhaust emission test engines that are installed in a wide variety of equipment that include a wide variety of fuel tank sizes and running loss vapor generation characteristics. (EMA) The proposal’s requirement that running loss controls be included when conducting exhaust emission tests is not practical. Emission tests are conducted in engine emission dynamometer test cells that include fuel delivery systems and do not generally include engine mounted fuel delivery systems. A given engine family may be utilized with a large variety of fuel tank configurations, some of which will be supplied by the engine manufacturer and some of which will be supplied by OEM customers. In addition, the inclusion of the running loss control system may significantly compromise the ability to comply with the requirements for running the exhaust emission test - i.e., measurement of fuel flow for raw gas testing. Accordingly, this requirement should be eliminated.

EMA commented on §1054.501(b)(6) “How do I run a valid emission test?” This requirement is not practical for emission testing. Exhaust emission tests are conducted in engine emission dynamometer test cells that include fuel delivery systems and do not typically include engine mounted fuel delivery systems. A given engine family may be utilized with a large variety of fuel tank configurations, some of which will be supplied by the engine manufacturer and some of which will be supplied by OEM customers. Accordingly, this section should only include the first sentence, and the remainder of the section should be deleted.

Letters:

Commenter	Document #
OPEI	0675
EMA	0691

Our Response:

As described in Chapter 5 of the Regulatory Impact Analysis, we measured in-use fuel temperatures and corresponding emission rates to quantify running loss emissions from various types of equipment. In some cases, measured temperature increases and emission rates were small. However, we noted that some equipment had fuel tanks positioned closer to the engine or other heat sources such that they experienced significant fuel heating. One case involved a 24°C temperature rise, which corresponded to a 69.3 g/hour emission rate. Total fuel consumption for a Class I engine might be about 300 g/hour (220 g/kW-hr with a 3 kW engine operating at 50 percent load). In this case, the engine would be ingesting 25 percent more fuel than it was designed for. The engine’s emission controls would clearly not be able to compensate for this unmetered vapor load. Class II engines have higher fuel flow rates, but a similar assessment shows that a 12 kW engine would be ingesting about 6 percent more fuel than it was designed for. Even this smaller deviation would likely cause an engine without feedback controls to exceed emission standards.

Measuring emissions from an engine for which the onboard fuel tank supplies the fuel, including any running loss vapors routed to the intake, is not difficult with dilute-sampling equipment. We understand that this is much more difficult with raw sampling, and that individual labs may have some safety-related or other restrictions that make it impractical to do this testing. As a result, we are keeping the specification to include ingestion of actual or simulated running-loss vapors in the engine’s intake during exhaust testing, but we are adding an allowance for manufacturers to make an engineering evaluation to show that actual vapor loads from in-use engines will not cause the engine to exceed the emission standard (or FEL if applicable). This would preserve the motivation for engine and equipment manufacturers to minimize the heat load on fuel tanks and to account for any remaining effect in establishing their compliance margins. We would expect any EPA measurement of exhaust emissions to include running-loss vapor loads (representative of in-use operation) as much as possible. For engine-mounted tanks, we would expect to simply duplicate (or retain) this configuration for laboratory operation. For remote-mounted tanks, we may measure fuel temperatures from in-use equipment to properly simulate the running-loss effects.

In cases where the engine manufacturer also designs the configuration and placement of the fuel tank, this exercise should be straightforward. We understand, however, that equipment designs may include a wide variety of configurations that are not all within the engine manufacturer's control. In these cases, we would expect engine manufacturers to do development testing with their engines to be able to understand the sensitivity and limits of their engines' compliance with exhaust emission standards as a function of running-loss vapor loads. For loose engine sales to equipment manufacturers that control fuel tank designs, we would expect engine manufacturers to specify in their installation instructions some appropriate limits on the extent of tank heating to prevent the engine from exceeding applicable emission standards. For example, engine manufacturers could directly specify a maximum vapor load (in grams per hour) for continuous operation in the final installation. The vapor load for a given operating condition would vary depending on the size of the tank. Engine manufacturers could therefore alternatively specify a table of values for maximum fuel-tank temperature rise for fuel tanks with a range of capacities. The specifications in these installation instructions would form the basis of the engine manufacturer's simulation or analysis to demonstrate that the engine will meet emission standards in the final installation. Engine manufacturers may need to select a higher Family Emission Limit to include a sufficient compliance margin to take running-loss effects into account.

2.5.7 Cycle-validation criteria

What Commenters Said:

EMA commented on §1065.514(f) Cycle-validation criteria. While statistical cycle validation makes sense for transient test methods, it is an unnecessary encumbrance to steady-state testing. The current method is to track minimum and maximum speeds and torques observed during the sampling period; test mode acceptance requires the extreme deviations from the desired set point to be less than a percentage of set point. If statistical steady state mode validation is required, the test control system will need to be revised, at considerable cost to the manufacturer with no resulting environmental benefit. Accordingly, statistical cycle validation should not be required for Small SI engines.

EMA commented that the requirement to control torque as needed to meet §1065.514 is not feasible for test modes with very low target set points. Currently, pursuant to §90.410 the torque control requirement for Phase 2 engine testing is "hold the specified load within the larger range provided by ±0.27 Nm (±0.2 lb-ft), or ±ten (10) percent of point". EMA commented that this section must include a similar provision for testing of engines where the required torque set points cannot use the cycle validation criteria required by §1065.514.

EMA commented further on cycle-validation criteria: While the prescribed cycle-validation criteria and statistical cycle validation is viable for transient test methods, it is an unnecessary encumbrance to steady state testing. Currently, engine manufacturers track the minimum and maximum speeds and torques observed during the sampling period, and the test mode acceptance criteria require the extreme deviations from the desired set point to be less than a percentage of set point. No environmental benefit is achieved from the addition of statistical cycle validation criteria for steady-state testing, and it raises serious concerns for engine manufacturers. Accordingly, EMA recommends that these requirements be waived for Small SI engines.

In response to a draft version of regulatory text suggesting updated cycle-validation criteria for nonhandheld engines, EMA suggested that the language should be in part 1054, not in part 1065, since it should apply specifically for Small SI engines. EMA further suggested that any change to what is required under §90.410 today would raise significant concerns.

Letters:

Commenter	Document #
EMA	0807
EMA	0691

Our Response:

Specifying nominal test speeds and loads with no cycle-validation criteria is meaningless. Without some definition of acceptable deviation from the reference values, it would be impossible to invalidate a test no matter what speeds and loads the engine actually experienced. Manufacturers are testing with cycle-validation criteria today. These specifications provide a useful starting point for setting appropriate specifications.

The current requirements in part 90 specify that torque for Modes 1 through 3 stay within 5 percent of point. Torque for Modes 4 and 5 must stay within 0.27 Nm or within 10 percent of point, whichever is larger. This allows for very sloppy testing, especially for small engines. For an 85 cc engine with peak torque of 4.0 NM, the nominal torque setting for Modes 4 and 5 would be 1.0 and 0.4 Nm, respectively. Specifying these points as 0.4±0.27 Nm and 1.0±0.27 Nm means that any torque value between 0.13 and 1.27 Nm would be a valid test point except for the narrow range of 0.67 to 0.73 Nm. This effectively allows the manufacturer to pick the most favorable torque values for certification. Seen another way, this could be utilized for EPA testing as similar to not-to-exceed zones for specifying any test point around the nominal value. This is clearly not the intent of the specified parameters.

We believe an alternative approach is better for targeting the nominal torque values for very small engines and will not increase the burden for running a valid test. Specifically, we believe there should be separate parameters to address a tolerance for the range of measured values and a limit for the mean value over the sampling period. Setting a tolerance specification of ±2 percent of point or ±0.27 Nm, whichever is greater is consistent with the part 90 specifications, allowing for an achievable range of values for high-power and low-power modes. An additional specification to keep the mean torque value within of ±1 percent of point or ±0.12 Nm, whichever is greater, ensures that the manufacturer targets a true nominal value even if there is substantial fluctuation in torque values during the sampling period. This prevents a manufacturer from intentionally biasing torque values low or high to take advantage of the wide tolerances that are necessary to accommodate the very low power levels. Mean values are inherently much more stable than instantaneous values, so achieving the narrower range of values for the calculated mean torque should also be very achievable with current engines and with current test equipment.

2.6 Production-line testing

Comment	Response
EMA and OPEI commented that emission tests are often invalidated because one of the requirements specified in the test procedures was not met. Such requirements could be anything from a span check, a test condition parameter out of range, or any number of criteria required to conduct a valid test. Accordingly, they commented manufacturers should not be required to explain the reasons and report the emissions results from all tests that have been invalidated. Reporting of all test results would only be appropriate if EPA specifically recognizes that data obtained from an invalid test can not be utilized to determine compliance. By default, the new test should become the official test results. In EPA Phase 1 and 2 as well as CARB, this degree of authorization is not required.	We agree that manufacturers should not need to get EPA approval before invalidating and repeating a test when a problem arises. However, we continue to be concerned that allowing manufacturers to omit reports of invalidated tests could result in manufacturers finding a way to invalidate a test based on the observation that the engine has failed or will fail to meet emission standards. We believe we can best address these competing concerns by requiring manufacturers to document their invalidated tests, including the reason for invalidating and any emission results that were recorded. The manufacturer could include an explanation describing why (or to what extent) the reported emission results from the invalidated test do not reflect the engine's actual performance. We believe the proposed regulatory text in §1054.305(g) properly balances these concerns.
OPEI commented that EPA Phase 2 and CARB all require that production line test reports be filed within 45 days of the end of the quarter instead of 30 days, as proposed in §1054.3145. EPA is now requesting a different time period. OPEI requested keeping harmonization with CARB (report due 45 calendar days within end of test period).	We agree that quarterly reports for production-line testing should be due 45 days after the end of each quarter, consistent with our approach under part 90.
EMA commented on §1054.301(f) "When must I test my production-line engines?" EMA commented that the reference to 40 CFR 1068.27 is redundant and should be deleted.	We agree that the reference to §1068.27 is not necessary and have removed it from the regulation.
EMA commented on §1054.301(b) "When must I test my production-line engines?" EMA noted that the referenced section (§1054.32fs5) does not exist. EMA believes that the correct reference is to §1054.325.	In regard to the reference to §1054.32fs5, we appreciate the comment and have revised the reference as recommended.
EMA commented on §1054.305(d) "How must I prepare and test my production-line engines?" EMA commented that the requirement to adjust parameters must be clearly limited to adjustable parameters as defined in §1054.115(b). In addition, EMA commented that adjustment of the idle speed outside of the adjustable range as defined in §1054.305(d)(1) is not appropriate. Manufacturers determine idle speed ranges and tolerances. Adjustments outside of the manufacturers recommended tolerance are not appropriate.	The proposed provision related to adjusting idle speed was derived from the current regulations at §90.508 where we describe adjustments needed to operate an engine until it has reached stabilized emission levels. The original specification may have been related to the technology used for engines in that time frame. In any case, we are not aware of any need for making idle adjustments as described in the proposal. This includes a review of the testing we performed to establish the feasibility of the Phase 3 emission standards. We have therefore removed this provision from the final rule.
ECO commented that EPA should allow small volume engine manufacturers to utilize the use of alternative testing methods (portable emissions analyzers) to demonstrate in-use field testing compliance for production units.	We agree that the regulations should allow for simpler measurement methods for production-line testing, as described in Section 1.3.4.

Letters:

Commenter	Document #
OPEI	0675
EMA	0691
ECO	0712

2.7 Equipment-manufacturer flexibilities

2.7.1 Duration and extent of allowances

What Commenters Said:

OPEI commented that without the proposed equipment transition flexibility, the EPA Phase 3 program cannot be implemented without causing substantial and unnecessary injury to equipment manufacturers and to the market. Non-integrated OEMs producing outdoor power equipment must be able to stagger their complex and iterative-development and product evaluation process, for their most challenging catalyzed muffler configurations and for their difficult fuel tank technologies (such as roto-molding). OPEI commented that it supports the allowance of 30% of one year's production for large OEMs. OPEI also supports the proposed 4-year transition period of the 2011 through 2014 model years.

OPEI commented that it strongly objects to EPA's suggestion in the preamble that the proposed hardship relief measures in the Phase 3 regulation could somehow moot the independent need for the equipment-transitional flexibility program. Both proposed elements are critical to the industry and to the effective implementation of the final program.

In response to EPA's request for comments on whether the transition program for equipment manufacturers somehow moots the need for the proposed Delegated Assembly Program (or visa versa), OPEI commented that both programs are necessary and the two programs serve separate, distinct purposes. OPEI noted that EPA has failed to evaluate or quantify (in its administrative record or in its SBREFA process) the substantial economic damages that would result without either the proposed equipment flexibility or the Delegated Assembly provisions. OPEI commented that EPA's other off-road emission regulations explicitly recognize the separate and independent need for Delegated Assembly, equipment-transition flexibilities, and hardship relief. Consequently, it would be arbitrary for EPA to abruptly eliminate any one of these flexibilities for small engines. (Also included in Section 2.8.1)

EMA supported the proposed delegated assembly and equipment manufacturer flexibility provisions included in the NPRM. EMA commented that EPA must incorporate both of these programs into the final rule. If EPA were to adopt only the delegated assembly program and not the equipment manufacturer flexibility program (or visa versa), EMA commented that the functionality of the adopted program would be significantly impaired by the absence of the other program. (Also included in Section 2.8.1) The inclusion of aftertreatment systems into an equipment manufacturers' exhaust system requires a much broader set of changes than just packaging the catalyst into an existing muffler. In many cases, the introduction of an exhaust system that includes a catalyst will require a complete redesign of the exhaust system and/or the equipment in order to provide the necessary space and heat management of the exhaust system. This required redesign of the exhaust system/equipment is an enormous burden to the manufacturer and will create a significant strain on its resources. Accordingly, EMA believes that the flexibility provisions are absolutely necessary and must be incorporated into the final rule in order to ensure that manufacturers have the ability and time required to complete the necessary redesign.

CARB commented that it believes the proposed transition program for equipment manufacturers is unnecessary since most equipment manufacturers are working together with their engine manufacturers to meet California’s Tier 3 standards. The equipment manufacturers are already working together to address concerns regarding lead-time, coordination, and other aspects involved in meeting the standards. CARB also commented that the proposed eligibility requirements for the TPEM program (i.e., only those manufacturers that have primary responsibility for designing and manufacturing equipment and whose manufacturing procedures include installing engines in the equipment are eligible) make it difficult to determine and enforce which manufacturers would actually qualify for the program.

Letters:

Commenter	Document #
OPEI	0675
EMA	0691
CARB	0682

Our Response:

In response to the comments that a TPEM program is not needed because of CARB’s Tier 3 program, EPA continues to believe a TPEM program is necessary for the manufacturers of Class II equipment. While CARB’s Tier 3 standards took effect in the model year 2008, the major engine manufacturers appear to be using ABT credits to certify to the standards since most of the engines certified with CARB in the Class II category have FELs above the Tier 3 standard of 8.0 g/kW-hr HC+NOx level. While it is not clear how long it will be before manufacturers redesign their Class II engines for California, it is likely that the engine manufacturers will not have a full set of engines redesigned until 2011 or later when EPA’s Phase 3 standards take effect. Because equipment manufacturers may need to make changes to some equipment designs to accommodate the redesigned Class II engines, EPA believes a TPEM program will help to ensure the transition to the Phase 3 standards goes smoothly for equipment manufacturers. EPA believes the basic framework of the TPEM program which allows manufacturers to use Phase 2 engines over a four year period on up to 30% of their average Class II sales is appropriate and we are finalizing those levels in the final rule, as proposed.

EPA agrees with the comments that the TPEM program and hardship provisions are both needed for the Phase 3 program. The hardship provisions are intended to help manufacturers that are facing economic hardship as a result of not being able to comply with the new standards. The criteria for qualifying for hardship are set at a relatively high level, which would likely be difficult for a manufacturer to demonstrate if they were having difficulty redesigning only a few of their equipment models. The TPEM program allows an equipment manufacturer to deal with the models which are difficult to redesign without having to demonstrate that the company would experience hardship without the relief. Therefore, EPA agrees that both the TPEM program and the hardship provisions are needed and is retaining both of them for the Phase 3 program.

EPA agrees with the comments that the TPEM program and the delegated assembly provisions are both needed for the Phase 3 program. The delegated assembly provisions allow manufacturers to independently source their exhaust systems based on the catalyst specifications determined by the engine manufacturer. However, the delegated assembly provisions will not ensure that an equipment manufacturer will be able to redesign all of their equipment models in time to accommodate a Phase 3 engine. Therefore, EPA agrees that both the TPEM program and the delegated assembly provisions are needed and is retaining them for the Phase 3 program.

EPA disagrees with the comment that the criteria used to qualify manufacturers for the TPEM program makes it difficult to determine who is eligible. The purpose of the eligibility criteria is to ensure that only those companies that truly manufacture equipment can participate in the program. We do not want companies that only import complete equipment or companies that only install engines into a pre-existing equipment chassis to be eligible for the program. EPA has made this clear in the regulations. If there is any question regarding a manufacturer's qualifications, EPA can request information from the manufacturer to determine if they actually are designing/manufacturing equipment and installing engines under the authority granted in Section 208 of the Clean Air Act. Section 208 (which applies to nonroad engines under section 213(d) of the Clean Air Act) describes the information collection requirements for manufacturers and states that manufacturers must provide information that EPA may reasonably require to determine whether manufacturers have acted in compliance with regulations. For this reason, EPA is retaining the eligibility criteria for equipment manufacturers in the final regulations.

2.7.2 Additional allowances for mid-sized companies

What Commenters Said:

OPEI commented that it supports the proposed mechanism to allow small and mid-sized OEMs to request up to a 70% production-based allowance (on a case-by-case basis).

NESCAUM commented that they oppose the various provisions for small and medium volume manufacturers of engines and equipment that extend the use of Phase 2 compliant land-based SI engines for several years beyond the initial introduction of Phase 3 engines. However, they would not oppose a program whereby small businesses may apply individually to EPA for limited temporary relief from specific requirements due to economic hardship or other circumstances beyond their control.

Letters:

Commenter	Document #
OPEI	0675
NESCAUM	0641

Our Response:

EPA is retaining the special TPEM provisions for small- and medium-sized companies in the final rule. EPA believes that such companies face a bigger challenge with regard to equipment redesign than large companies because the small- and medium-sized companies tend to have fewer resources (i.e., both staff and money) available to work on equipment redesign. Therefore, EPA believes it is appropriate to offer more flexibility to these companies under the TPEM program. For small-sized manufacturers (defined in the regulations as producing no more than 5,000 pieces of nonhandheld equipment per year), the extra flexibility is automatic and allows them to exempt a cumulative 200% over four years. For medium-sized companies (i.e., those producing between 5,000 and 50,000 units with Class II engines), the manufacturer can request up to an additional 70% allowances over the four years, but must provide a variety of information to EPA to justify its request.

In regard to the comment on relying on hardship requests instead of additional TPEM allowances for small- and medium-sized businesses, EPA does not believe that making a hardship provision the primary means for obtaining additional allowances would be workable for manufacturers or EPA. As noted above, smaller companies have limited resources to allocate to equipment redesign. Even though they may be small, many of these companies have a wide range of equipment offerings. EPA would rather see these businesses working on the equipment redesigns than pulling together information to request additional allowances from EPA. Plus, it potentially would place additional significant burden on EPA to review hardship applications, since there are over three hundred eligible small- and medium-sized equipment manufacturers. Therefore, EPA is retaining the TPEM provisions for small- and medium-sized businesses as proposed.

2.7.3 Reporting and recordkeeping

What Commenters Said:

OPEI commented that it supports the proposed EPA notification, recordkeeping and ongoing annual reporting requirements for equipment manufacturers – these proposed provisions should be more than adequate to protect the integrity of the program. Any additional requirements would be overly burdensome.

OPEI commented that it supports the proposed provision that would allow engine manufacturers to simply keep records showing their TPEM engines met the Phase 2 standards – rather than re-certifying those TPEM engines for the current model year.

EMA commented that it agrees it is not appropriate or necessary to certify Phase 2 compliant engines used in the equipment flexibility program. EMA commented that engine manufacturers must be allowed to measure emissions prior to the catalyst, or with and without catalyst, during deterioration factor determination and certification emission testing being conducted for Phase 3 certification in order to generate the required data (i.e., data showing that the engine family, without aftertreatment, will comply with the Phase 2 standard) with the minimum amount of extra time and expense. Specifically, EMA commented that the provisions in §1054.625(j)(2) must allow the test data required by sub-paragraph (i) to be measured prior to the catalyst as part of the testing requirements for certification to Part 1054 Standards.

EMA submitted two further comments on the regulatory language for the transition program for equipment manufacturers. First, EMA commented on §1054.625(g)(1)(iv) “What requirements apply under the Transition Program for Equipment Manufacturers?” EMA commented that equipment manufacturers will not be able to provide the name and address of the company that produces the engines that it will be using for the equipment exempted under this section prior to June 30, 2010. They commented that this requirement is impractical and should be deleted. Second, EMA commented on §1054.625(g)(2) “What requirements apply under the Transition Program for Equipment Manufacturers?” EMA commented that all manufacturers using the program should be required to comply with the reporting requirements set forth in this section for each year of the program, or until the manufacturer’s ability to use the program has expired.

Letters:

Commenter	Document #
OPEI	0675
EMA	0691

Our Response:

EPA is retaining the reporting and recordkeeping requirements for the TPEM program with some minor modifications, as noted below, in response to the comments summarized above. First, EPA is revising the provisions of §1054.625(j)(2)(i) to allow manufacturers to measure emissions prior to the catalyst to show that an engine would meet the Phase 2 standards. EPA believes it is appropriate to give manufacturers the option of measuring emissions either before the catalyst or with a non-catalyzed version of the exhaust system to show that an engine would meet the Phase 2 standards. Second, EPA is revising the provisions of §1054.625(g)i)(iv) to require equipment manufacturers to list the names of the manufacturer(s) whose engines they expect to use under the TPEM program. Because the information being requested is due before the TPEM program begins, EPA agrees that it would be difficult for an equipment manufacturer to know which manufacturer’s engines it would be using for the following four years of the TPEM program. However, equipment manufacturers should have an idea of which manufacturers’ engines it expects to use, and such information would be useful to EPA in monitoring the use of the TPEM program.

In response to the comment on §1054.625(g)(2), we are not making any changes to the regulations. EPA believes the referenced language already requires equipment manufacturers to report their use of the TPEM program to EPA for each year they participate in the program.

2.7.4 Labeling

What Commenters Said:

OPEI commented that to promptly respond to fluctuating demand, equipment manufacturers need the flexibility to designate their inventoried engines as either a Phase 3 TPEM engine or as a Phase 3 "Delegated Assembly" engine. The final TPEM labeling scheme must provide the needed flexibility to the OEM to designate his Phase 3 engines – after he has ordered and received his engine families In this regard, OPEI supported EPA's proposed labeling provisions for the equipment manufacturers, under which his label would simply state the equipment manufacturer's name and clarify that this is a TPEM engine. The engine manufacturer's original emission label will appropriately provide all the engine-emission information. A full content, equipment manufacturer, emission compliance label would be confusing to customers and agency personnel – regarding the certification, emission warranty, and other information typically provided by the engine manufacturer as specified in the engine labeling requirements. In the cases where the engine originates as a Phase 3 compliant product utilizing the Delegated Assembly provisions, the equipment manufacturer re-labeling of the engine must not interfere with the ability of the ultimate consumer or the agency to accurately identify the important information included on the engine label.

EMA commented that the content included on the engine/equipment manufacturer label should be sufficient to convey the fact that an engine is designated as a TPEM engine. EPA should not require the standard engine and/or equipment manufacturer emission compliance label to be placed on a TPEM engine. In the situation where a TPEM engine originates as a Phase 3 compliant engine under the delegated assembly program, the equipment manufacturer must be required to re-label the engine in a manner that will not interfere with the original engine label. EMA also commented on §1054.625(j)(2) "What requirements apply under the Transition Program for Equipment Manufacturers?" EMA commented that the reference in this section to the labeling requirement set forth in §1054.610(c)(7) is not appropriate and should be deleted.

Letters:

Commenter	Document #
OPEI	0675
EMA	0691

Our Response:

EPA is retaining the labeling provisions for TPEM equipment as proposed with only minor changes as described below. As supported by OPEI, the regulations allow a manufacturer to designate engines purchased under the delegated assembly program as either a TPEM engine (with a separate TPEM label applied by the equipment manufacturer) or a fully compliant Phase 3 engine (with the appropriate aftertreatment installed by the equipment manufacturer). EPA notes that the TPEM label that must be placed on the equipment does require additional information than noted in OPEI's comment supporting the proposed labeling provisions. In addition to stating the name of the equipment manufacturer and noting that the engine is a TPEM engine, the label must also contain contact information for the equipment manufacturer and the year in which the equipment is produced.

EPA disagrees with EMA's comment that a standard engine/equipment label should not be required on a TPEM engine. EPA believes it is important to require a full engine label on the engine as well as an additional equipment manufacturer label to identify TPEM equipment. The information on the labels allows EPA and others to identify important information about the engine and equipment that could be needed to verify compliance with the TPEM program. In response to EMA's comment on §1054.625(j)(2), EPA disagrees that the language is not appropriate. The citation is only a reference to the labeling requirements engine manufacturers must comply with for their delegated-assembly engines (which may end up as TPEM engines) and does not add any additional requirements. Therefore, EPA believes it is appropriate to include such a reference in the TPEM program regulations. It should be noted that in revising the regulations for the final rule, EPA has moved the labeling requirements for engines participating in the delegated assembly program to §1068.261, and therefore the language of §1054.625(j)(2) has been revised to reference the new section.

2.7.5 Additional provisions for imported products

What Commenters Said:

OPEI commented that it supports the proposed special provisions, including bonding, for foreign equipment manufacturers and importers of equipment made outside of the U.S. using TPEM engines.

Letters:

Commenter	Document #
OPEI	0675

Our Response:

EPA is adopting the provisions for foreign equipment manufacturers and importers of equipment made outside of the U.S using TPEM engines as proposed.

2.7.6 Relationship to tank permeation requirements

What Commenters Said:

OPEI commented that it supports the proposal to also allow equipment manufacturers to use non-compliant rotational-molded, "flex" fuel tanks on any of their equipment with TPEM engines. OPEI objects to EPA's proposed limit on "flex" fuel tanks requiring the OEM to first use up available banked credits or allowances from his early compliance with the fuel tank permeation requirements. This restriction takes away from the incentive for manufacturers to introduce compliant tanks early or to produce tanks with FELs below the standard. In addition, they believe this restriction will overly-complicate the administration of the program with no benefits.

OPEI submitted an additional comment after the close of the comment period regarding rotational-molded fuel tanks. They supported a delay in the permeation requirements for rotational molded fuel tanks instead of the proposed linkage to the TPEM program.

Letters:

Commenter	Document #
OPEI	0675
OPEI	0793

Our Response:

EPA is revising the allowance for equipment manufacturers to use non-compliant rotational-molded fuel tanks on their equipment with TPEM engines for the final rule. EPA continues to believe that equipment manufacturers may face challenges in transitioning all of their rotational-molded fuel tanks to meet the new permeation standards in the timeframe for the new standards. However, based on discussions with manufacturers, we have been convinced that there is not necessarily a direct link between the potential TPEM engines/equipment and the use of rotational-molded tanks on those engines/equipment. We are therefore allowing equipment manufacturers to use noncompliant rotational-molded fuel tanks for two additional years on limited numbers of 2011 and 2012 model year equipment using Class II engines, regardless of whether the equipment is part of the TPEM program. Equipment manufacturers may use noncompliant rotational-molded fuel tanks if the production volume of the fuel tank design used in Class II equipment models is collectively no more than 5,000 units in the 2011 model year. In the 2012 model year, equipment manufacturers may use noncompliant rotational-molded fuel tanks if the production volume of the fuel tank design used in Class II equipment models is collectively no more than 5,000 units in the 2012 model year, but the total number of exempted rotational-molded fuel tanks across the manufacturer's Class II equipment is limited to 10,000 units. If production volumes are greater than 5,000 for a given fuel tank design, all of those tanks must comply with emission standards. Tank designs would be considered identical if they are produced under a single part number to conform to a single design or blueprint. In addition, tanks would be considered identical if they differ only with respect to production variability, post-production changes (such as different fittings or grommets), supplier, color, or other extraneous design variables.

2.8 Delegated assembly

2.8.1 Need for delegated assembly

What Commenters Said:

OPEI noted that EPA has proposed a permanent Delegated Assembly program (see §1054.610) specifically designed for small spark-ignition engines. The purpose of this program is to create a very protective compliance program that would allow non-integrated engine manufacturers to distribute their certified engines without the required emission-related parts (i.e., catalyst) that are listed on and required for EPA certification. OPEI elaborated as follows:

> First, in the initial stage of developing the after-treatment system, the engine manufacturer must determine the catalyst-specific parameters including substrate size, precious metal loadings, and engine performance-related specifications to allow the catalyst to be packaged or canned so that it can be installed. The catalyst selection and packaging designs must provide the intended exhaust emission conversion and also manage exhaust and cooling air flow to ensure all safety concerns are addressed, and to manage sound and tonal qualities.
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> Second, the engine manufacturer identifies the "standard" muffler packages that meet the criteria identified above. In many cases there is only one "standard" muffler configuration designed and developed by the engine manufacturer. Engine manufacturers cannot specify the diversity of mufflers required to fit into specific equipment or to install packaged catalysts into such customized mufflers. Such customization is a very time-consuming and resource-intensive exercise that adds significantly to the complexity of the engine manufacturer's product as supplied to the equipment manufacturer. It is highly unlikely that engine manufacturers would be able to fundamentally change their business structure to supply customized mufflers in the future. Such a change in their business models would be tantamount to asking a major international supplier of lumber, which sells large volumes of stock lumber to less than one hundred wholesalers, to only sell customized, small volume cabinets or furniture to thousands of individual customers.
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> Third, for most Class II products, the catalyst prescribed by the engine manufacturer must be packaged into the muffler system prescribed by the equipment manufacturer because there is insufficient space to allow separate catalyst and muffler systems. Consequently, for the vast majority of Class II engines, engine and equipment manufacturers must depend on their independent muffler suppliers, who exclusively have the capacity and expertise to install catalysts properly into their customized mufflers. For most Class II products, the independent muffler supplier is the only party who can practically install catalysts into the mufflers for the vast majority of Class II engines and customize these products for the various equipment designs.
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> Fourth, without Delegated Assembly, the engine manufacturer would have to include specific catalyzed mufflers in the box with his shipped engines. The OEM would not be able to use many of these purchased and shipped mufflers because they would not fit into his final, complete applications. This problem results from the fact that an equipment manufacturer cannot wait for specific orders from his downstream retailers before he orders his engines. The OEM must typically purchase and receive large volumes of the same engine family, which must be used in many different models. Each model will likely have different or unique muffler configurations. Unpredictable market demand will drive the OEMs ultimate production of specific equipment models and therefore the volumes of the different engine-muffler combinations the OEM will ultimately build. When the engine is shipped to the OEM, neither the engine manufacturer, nor the equipment manufacturer may know which exact equipment models and/or which muffler configurations wil be used with each specific engine family.

OPEI concluded their argument by noting that EPA must finalize a practical Delegated Assembly program which allows direct shipments of catalysts from a catalyst supplier to a muffler supplier, who will be accountable and responsible for proper catalyst canning and will install the required catalyst in each application, prior to shipping the specialized catalyzed muffler to the OEM.

OPEI commented that as part of this preamble discussion, EPA incorrectly suggests that many muffler geometries are fairly uniform and that it should be possible to produce more standardized, “stock” mufflers that could be supplied directly through the engine manufacturer (see 72 Fed. Reg. at 28152). OPEI believes EPA grossly over-simplified the problems and challenges associated with applying and packaging exhaust/muffler systems onto a wide variety of equipment. While many mufflers have a somewhat common cylindrical geometry, the muffler mounting brackets, internal sound bafflers, and the header and tailpipe geometries vary greatly. One supplier of mufflers and exhaust components, released just under 100 unique components last year alone to address the variations in the muffler and exhaust configurations required to fulfill the OEM packaging requirements for these small engine applications. OPEI estimates that there are over 1000 different muffler configurations for these engines in the national marketplace today.

Traditionally, the muffler design is a compromise between exhaust back pressure, as prescribed by the engine manufacturer for emission compliance, and sound attenuation. The various applications these mufflers are installed in have unique trade-offs. OPEI commented that EPA needs to consider the unique requirements of the small engine market that serves applications such as: portable power, utility vehicles, golf carts, construction equipment, light towers, agricultural, etc. Other equipment may also have different requirements which can dramatically affect muffler designs. The application specific trade-offs often lead to unique internal design features of the muffler for each engine, in addition to external differences.

Of course, the principal challenge of muffler design is thermal management issues, which are safety-related and are a further constraint to application designs. The addition of a catalyst will create additional complexities and challenges, especially when dealing with off-nominal conditions such as engine misfire situations (See Sections III and IV above). The thermal management issues lead to a variety of different insulation and heat shield scenarios, which result in unique muffler configurations specific to the product design. Current experience with the development of catalyzed muffler systems that meet California Tier III regulations has confirmed that these product-designs and complex heat and emission-related challenges will demand customized mufflers that are supplied by a third party.

For all these reasons, OPEI commented that it does not believe that there will or can be a shift in the market place towards standardized “stock” muffler designs. OEMs will continue to depend on customized mufflers to facilitate their product designs as required to service their diverse markets. Consequently, OPEI commented that the Delegated Assembly Program is absolutely crucial to satisfy the market needs of the small SI applications to obtain catalyzed mufflers from their muffler suppliers.

OPEI noted that EPA has requested comment on whether the transition program for equipment manufacturers somehow meets the need for the proposed Delegated Assembly Program (see 72 FR 28152). Conversely, EPA requested comment on whether manufacturers will need the equipment-transition program (described above in Section III) if they can independently source their exhaust systems based on the Delegated Assembly Program (see 72 FR 28154). OPEI responded that the answer to both of these questions is no. OPEI believes both programs are necessary. In fact, the two programs serve separate, distinct purposes. Finally, OPEI commented that EPA has failed to evaluate or quantify (in its administrative record or in its SBREFA process) the substantial economic damages that would result without either the proposed equipment flexibility or the Delegated Assembly provisions (proposed in §1054.610). EPA’s other off-road emission regulations explicitly recognize the separate and independent need for Delegated Assembly, equipment-transition flexibilities, and hardship relief. Consequently, OPEI commented that it would be arbitrary for EPA to abruptly eliminate any one of these flexibilities for small engines.

EMA supported the proposed delegated assembly and equipment manufacturer flexibility provisions included in the NPRM. EMA commented that EPA must incorporate both of these programs into the final rule. If EPA were to adopt the delegated assembly program only and not the equipment manufacturer flexibility program (or visa versa), the functionality of the adopted program would be significantly impaired by the absence of the other program.

Honda noted that in the market today for small engine products, multiple businesses cooperate to produce parts for numerous small engine powered machines that are the design, production, and marketing responsibility of a multitude of independent equipment manufacturers. Each manufacturer in the process, including the final equipment manufacturer, may design and manufacture, design and outsource the manufacture of, or simply purchase an existing part. This distinction is important to identify who should take responsibility for the actual performance of the part.

Today, for larger sales volumes, engine manufacturers cooperate closely with equipment manufacturers to meet the equipment manufacturers' product needs. At a smaller manufacturing volume there is less direct contact but the process of matching the engine to the equipment and the documentation of this process are still in place. The key to the appropriate use of a specific engine in a specific application is based on a basic engineering evaluation of the engine matching document and of the general instructions for engine use. This concept works well when the equipment manufacturer uses the engine as it was built by the engine manufacturer. However, in actuality, a wide variety of equipment is used on an even wider variety of tasks and the equipment manufacturer must be able to tailor the engine to fit both the equipment and the task. For example, a trencher, earth rammer, concrete equipment, and a lawn mower work in similar dust and debris environments, but the packaging of a single engine model in the least vulnerable location to make a workable machine can result in very different requirements. The proposal's preamble includes a comparison of a handful of mowing equipment and concludes that it would be possible to package a single engine design in all machines. Honda believes this fails to look beyond the most popular use of small SI engines and does not recognize the significant diversity of small engine powered types of equipment.

Honda commented that the need for an equipment manufacturer to have flexibility in the final assembly of engine intake and exhaust components is critical for both large and small volume equipment manufacturers. An engine manufacturer cannot economically stock or supply in a timely manner, the array of components required by the diversity of the market. Only the equipment manufacturer that functions as an independent business, striving to create or improve a machine's design and target a value price, is in a position to create the best product for its customers. Similarly, the engine manufacturer is in the best position to provide engine matching tools and instructions that ensure the final engine assembly will be in compliance with applicable regulations and will match the required certification information. In many cases the engine manufacturer and the equipment manufacturer will work jointly, or with a third party, to ensure that the design is compliant with the regulations.

Honda suggested two alternatives to the proposed means of ensuring that the final assembly of the equipment will comply with the regulations and answer the concern about enforcement of the regulation.

1) Honda noted that in some cases the engine and equipment manufacturer (and potentially a third party supplier or testing facility) work together to fulfill the equipment manufacturer's product design targets. During that process, they generate enough information and working instructions that the equipment manufacturer could then submit an abbreviated certification form and be identified to the EPA as the manufacturer with responsibility for the specific configuration of that engine model used in the equipment manufacturer's particular final product. EPA could then assume its rightful role and use the Selective Enforcement Audit mechanism or confirmatory testing to verify that the product meets the requirements of the regulation. EPA would also know in advance which manufacturer is taking responsibility for what part of the final assembly.

2) Honda suggested that EPA supplement the definitions in 1068.101(b) and the text in 1054.20 so that it is clear that failure to follow the engine manufacturer's instructions for delegated assembly is tampering and/or falls into the category of a defeat device. This option could be applied when the equipment manufacturer does not interact directly with the engine manufacturer and an abbreviated certificate is not submitted. The equipment manufacturer in this case would need to follow the engine matching and installation instructions using its own data or engineering evaluation. This type of situation could also be treated in a manner similar to 1060.101(f) in the evaporative emissions section where the equipment manufacturer is "deemed to be certified." EPA will then have the necessary enforcement authority when they perform a field or factory audit of equipment. A thorough examination of the steps involved in engine distribution, product design and manufacturing, and the role of third party suppliers should make it possible to retain EPA authority to ensure emission compliance without disrupting the ability of both engine and equipment manufacturers to deliver innovative and value priced product to the consumer.

CARB commented that EPA's overall approach to the proposed delegated final assembly is reasonable and corresponds to CARB's current certification procedures. CARB believes that EPA should require engine manufacturers to be held responsible for ensuring that the catalysts are installed on the engines that are accumulating credits. Since the engine manufacturer is receiving the benefit of accumulating credits for these particular engines, they should make sure that the catalysts are being installed. Any instance of an engine found without a complete emission control system, as certified, should be treated as noncompliant, with all possible penalties. Allowing any exceptions would send an inappropriate message to the manufacturers.

Letters:

Commenter	Document #
OPEI	0675
EMA	0691
CARB	0682
Honda	0705

Our Response:

An important point to clarify before evaluating the commenters' arguments in support of delegated assembly is that under any conceivable regulatory scenario we would require mufflers that are shipped directly from the muffler manufacturer to the equipment manufacturer to be specifically included in the engine manufacturer's application for certification. While the commenters describe or imply a need for equipment manufacturers to have an unrestrained ability to work out design parameters with muffler manufacturers, we have neither proposed nor considered such an outcome. OPEI's description betrays an understanding that equipment manufacturers should have an unrestrained ability to change muffler designs parameters even if that affects emission levels. We acknowledge that muffler design involves compromises between back pressure, thermal management, and sound attenuation. A muffler design that is not specifically part of the engine manufacturer's application for certification will inevitably involve design parameters that favor non-emission factors over factors important for controlling emissions. The result would be a noncompliant engine and a situation where the certifying manufacturer will disclaim any responsibility for the performance of its own engine. This is clearly unacceptable. The certifying engine manufacturer is responsible for ensuring compliance and therefore needs to be in control of design variable that could affect whether engines meet emission standards or not.

We agree with the commenters that muffler manufacturers play an important role in incorporating an engine manufacturer's specified catalyst into a muffler that appropriately controls air flow for maintaining catalyst performance, managing external surface temperatures, and provides proper sound attenuation. However, this fact alone does not demonstrate that equipment manufacturers need to be able to get customized mufflers for every equipment model. There are many examples of current engine and equipment models in which mufflers and catalysts flow from component manufacturer to engine manufacturer to equipment manufacturer, with varying degrees of involvement by equipment manufacturers in the design parameters of the exhaust components. Regardless of the extent to which engine and equipment manufacturers would work out arrangements for delegated assembly, every engine manufacturer will need to certify their engines using some number of stock mufflers. In the transition to new emission standards, engine and equipment manufacturers will work out the degree to which multiple muffler configurations will be needed to meet the design needs for the range of equipment models that will be affected. The Transition Program for Equipment Manufacturers provides four years of a more flexible transition to allow for these negotiations and adjustments.

OPEI's analogy to a lumber supplier needing to start selling custom cabinets exaggerates the business dynamic in question. The comparison does not acknowledge that engine manufacturers are already selling the new product (engines with mufflers) in many cases, that engine manufacturers are liable for the performance of the finished product, or that equipment manufacturers have to design their equipment around a given muffler design, whether or not the muffler is manufactured to their specifications. Our objective is not to create a better analogy, but the weakness of this comparison highlights our concern that the commenter is unable to provide a straightforward rational assessment of the situation.

The fundamental gap in the argument presented is the interplay between equipment and engine manufacturers in coming up with final design specifications. We believe that purchasing agents and design engineers working for the equipment manufacturers will have an important role in moving successfully into a new era in which engine manufacturers have a legal responsibility to ensure that exhaust systems are properly designed and assembled for compliance with exhaust emission standards. Purchasing agents for equipment manufacturers buying large volumes of engines can have a very significant influence over the engine manufacturer's design parameters. As a result, we would expect these dominant equipment manufacturers to effectively dictate muffler designs to ensure that available stock mufflers meet their needs, considering physical dimensions, thermal management, and sound attenuation. Engine manufacturers would want to make a reasonable number of muffler configurations available, so we would envision this process playing out such that several stock mufflers would be available.

Even under the broadest conceivable approach to delegated assembly, equipment manufacturers will be unable to get customized mufflers for their small-volume products. Since engine manufacturers need to agree to add each muffler configuration to their application for certification and enter into a contract with equipment manufacturers creating customized mufflers, there will be many cases where this option isn't viable or cost effective. Engine manufacturers may decide that a custom design presented to them by an equipment manufacturer is unacceptable, or they may be unable to provide the resources to make this determination. They may be unwilling to trust the equipment manufacturer to properly procure parts for and assemble the final products such that every engine is in its certified configuration before delivery to the end user. These potential complications were given credence by one manufacturer who communicated to us that their plan is to participate in delegated assembly using a custom muffler from an equipment manufacturer only if the equipment manufacturer performs a complete round of testing, including service accumulation over the engine's full useful life, to show that the new muffler design complies with the underlying certificate. This is more than we require currently, but it illustrates a prudent approach by engine manufacturers to protect themselves from the liability of delegating important compliance responsibilities to other companies.

Design engineers working for equipment manufacturers also have an important role to play in this process. While OPEI suggests that equipment manufacturers will need to discontinue production of equipment models if they can't procure customized mufflers, we believe this ignores the equipment manufacturers' ability to adjust the designs of their equipment to accommodate a specific muffler configuration supplied to them by an engine manufacturer. As noted in the comments, there are many examples of custom muffler designs that are tailored to a specific type of equipment. If that custom muffler was no longer available, design engineers for the equipment manufacturer could, for example, adjust mounting brackets, accommodate a different muffler orientation, or otherwise make the muffler fit to allow the equipment to satisfactorily perform its function. While there would be a significant effort and expense to modify equipment designs just for a muffler change, the incremental effort of accommodating a muffler change as part of a broader equipment redesign is much smaller. Our understanding is that equipment models are typically redesigned every five to eight years. (The cost estimates in Chapter 6 of the Final Regulatory Impact Analysis take into account the cost of modifying equipment as part of an overall redesign.)

Customizing mufflers for sound attenuation and thermal management should be easily managed by the engine manufacturer. We believe engine manufacturers will be strongly motivated to meet market demands by working with muffler manufacturers to create a menu of stock mufflers that provide varying degrees of sound attenuation. The engine manufacturer would be well positioned to efficiently design for sound attenuation by integrating that effort into an overall design program to develop a catalyst and exhaust configuration that meets emission standards. Similarly, thermal management of exhaust surfaces is fundamentally related to engine operation. Engine manufacturers are best positioned to design mufflers (in cooperation with muffler manufacturers) such that all possible engine operating modes are considered when properly designing a muffler to avoid any risks associated with high surface temperatures.

We would also caution against the tendency to overstate the extent of change in muffler designs resulting from our proposal. Our testing to support the feasibility of the new emission standards showed that an existing muffler could be modified to incorporate a catalyst primarily by rearranging the internal flow paths, without significantly changing the muffler's outer dimensions. We also showed that this could be done without significantly increasing external surface temperatures. This is not to say that engine and muffler manufacturers won't develop mufflers that have notable differences from current designs, rather that we are not expecting dramatic changes in these designs. As a result, we believe the design challenge for equipment manufacturers will mostly involve the transition from customized to stock mufflers. As noted above, this will involve little or no change for high-volume products, because equipment manufacturers will in effect dictate that their custom design becomes one of the standard configurations from the engine manufacturer. For the remaining equipment models, we are confident that equipment manufacturers will be able to make the changes needed to accommodate a stock muffler, such as rearranging mounting brackets, repositioning mufflers, or otherwise to make the mufflers fit into the overall equipment design.

We also believe that the commenters grossly overstate the current need for customized mufflers. We stand by our observations in the preamble of our proposed rule regarding the standardization of mufflers in current products. The products we observed with relatively uniform muffler configurations represented a wide range of models, brands, and applications. Moreover, the general observation was that the nature of mufflers and exhaust systems is that they need space to safely and effectively route hot exhaust gases away from the engine and into the atmosphere. We suspect that the large number of muffler configurations produced today is mostly related to proper mounting, orientation, and plumbing to fit the muffler into the equipment. Redesigning most equipment for a standard muffler configuration should involve only modest changes to shift the position of the muffler or to change the cage or shielding or frame that currently houses the muffler. That is not to say that there aren't examples of mufflers that are more carefully tailored to specific equipment models, rather that we believe this practice is much less common than suggested by the commenters. We understand that these changes will take time and effort, but we believe that they are well within reach for equipment manufacturers, especially as part of an overall equipment redesign. The time available before the standards take effect and the flexibility provisions built into the final rule should allow equipment manufacturers to work with engine manufacturers for an orderly transition in their equipment designs to the extent that is needed.

Two examples from observations made at the 2006 Louisville Expo for lawn and garden equipment highlight the difference in opinion as to the extent of the redesign that will be necessitated by this rulemaking. First, we observed a four-wheel drive utility vehicle in which the compartment to house the engine and the whole exhaust system were internal to the body of the vehicle, located primarily behind and under the driver's seat. This would seem to be a prime example of a need for a specialized muffler confined in a limited space, since every amount of space devoted to the engine and exhaust system was space made unavailable for passengers and payload. Despite this trade-off of utility and comfort, the vehicle design included a relatively large cavity for the muffler and other exhaust components. Clearly this amount of space was needed to provide adequate clearance from the exhaust surfaces to avoid exposing other parts of the vehicle to such high temperatures. We suspect that an effort to change to a different muffler, even one with a very different shape, would not be impossible.

In a second example, an equipment manufacturer complained vehemently that their engine supplier insisted on supplying the muffler with the engine, leaving them with the extraordinary burden of fitting the stock muffler into their equipment. The representative claimed to have a worst-case equipment model on display– a riding lawn mower with several premium features, including a plastic collection bin mounted behind the mower and over top of the exhaust system. In this case the muffler was mounted in a cage for preventing accidental contact with hot exhaust surfaces, again with rather generous spacing around the muffler. It was apparent that changing this equipment model would require significant time to address design concerns such as fit, weight distribution, exposure to radiant heat, etc. We believe, however, that these design challenges could all be addressed even by a company with very limited engineering resources. Having several years to plan and execute these changes seemed to be a very reasonable expectation, even in this worst-case configuration. These observations support our conclusion that equipment manufacturers will be able to respond to changing muffler designs in the context of the Phase 3 standards, especially if they have a transition period that will allow them to factor in the necessary changes in advance. Furthermore, the fact that there is already an example of an engine manufacturer telling its customers that only stock mufflers are available demonstrates that this can be a business decision negotiated between companies rather than one that is inherently and necessarily subject to the control of equipment manufacturers.

It is important to note the comparison with nonroad diesel engines, as we are expecting those engines to include new aftertreatment devices to meet Tier 4 standards. These aftertreatment devices will be new, relatively large components added to exhaust systems (not incorporated into existing mufflers) that equipment manufacturers will need to accommodate. We will allow the equipment manufacturers the flexibility of using limited numbers of previous-tier engines for several years (much like the Transition Program for Equipment Manufacturers described above). There is an expectation for the long term that equipment manufacturers will be able to use stock aftertreatment devices from the engine manufacturers as part of their equipment design. The expected design effort for Small SI equipment pales in comparison to the efforts expected from the nonroad diesel equipment manufacturers. We also note that the program for nonroad diesel engines is the only other one in which we have adopted both delegated assembly and a Transition Program for Equipment Manufacturers. These are not universal and inherent aspects of our compliance programs, as suggested by OPEI.

Aside from the question of who designs catalyst and muffler configurations, we acknowledge that there are business reasons to prefer shipping mufflers directly from the muffler manufacturer to the equipment manufacturer. This was the original purpose of the delegated-assembly provisions we adopted in §1068.260. OPEI's comments appropriately describe the situation for an equipment manufacturer in that situation, needing to manage large numbers of equipment models, each with multiple engine and muffler configurations. The dynamics of managing inventories to produce all of these equipment models causes us great concern that every assembled unit is built properly in its certified configuration. This is the basis of the extensive protective measures we believe are necessary to ensure that engines are properly assembled.

We also acknowledge that, with proper constraints and controls, engine manufacturers can work with equipment manufacturers that they trust to install properly designed catalyzed mufflers. Some of these mufflers may have been designed by the equipment manufacturer together with the muffler manufacturer and coordinated with the engine manufacturer, such that final engine assemblies will meet the required standards. As a result, we believe it is appropriate for the final rule to include a carefully constructed delegated-assembly program for Small SI engines in addition to the Transition Program for Equipment Manufacturers that will allow manufacturers a flexible transition period to incorporate any engine or muffler design changes resulting from compliance with the Phase 3 standards. This transition period will allow time for market forces to work toward a sensible degree of accommodation between engine and equipment manufacturers as they find the best way of dividing design and assembly responsibilities such that they preserve the engine manufacturers' ultimate control over design and compliance responsibility and at the same time recognize the equipment manufacturers' need to make equipment that functions within the limitations in muffler design and specifications required due to certification. There is a continuing need for delegated assembly after this transition period, but we believe this is more of a business decision regarding the most efficient method of designing and shipping product than an inherent necessity for equipment manufacturers to be able to produce equipment with certified engines that can be used in a multitude of applications. Accordingly, we are adopting delegated-assembly provisions for Small SI engines that include greater initial flexibility, after which a narrower set of provisions apply, as described in Section 2.8.2.

We believe the proposed regulations already reflect Honda's suggested approaches for dividing responsibilities among engine and equipment manufacturers. The idea that equipment manufacturers rely on an abbreviated certification for designs that fall outside of the engine manufacturer's certified configurations was proposed in §1054.612. This gives the equipment manufacturer the ability to recertify an engine family without generating a new deterioration factor or conducting production-line tests. Also, the current regulations in §1068.105 clearly state that equipment manufacturers violate the tampering prohibition if they fail to follow an engine manufacturer's installation instructions. However, it would not be appropriate for the engine manufacturer's installation instructions to simply specify broad design parameters that equipment manufacturers would then follow, with some unspecified testing or engineering evaluation to support a conclusion that the resulting engine design is covered by a certificate. The "deemed certified" approach proposed in §1060.101 is limited to requirements that are so straightforward that they can be established by simple observation. Evaluating compliance with exhaust emission standards is far from straightforward. We therefore believe that approach of considering engines certified through an informal demonstration does not meet the requirement under the Clean Air Act for engines to be certified based on a demonstration that measured emission levels are within prescribed limits. We also believe manufacturers would be unwise to delegate this level of responsibility to another company, since they would be held liable for any noncompliance resulting from any designs that fall short of meeting emission standards.

2.8.2 Specific provisions for delegated assembly

What Commenters Said:

General:

OPEI noted that EPA requested comment on the need for the specific provisions of the Delegated Assembly for small engines with catalyzed mufflers in comparison to other non-road engine/equipment categories as defined by current regulations (72 Fed. Reg. at 28149-28152). OPEI commented that the proposed small SI provisions are essential in order to respond to the following unique constraints of the small spark ignition engine and equipment industry: (1) the cost sensitive nature of the products produced; (2) the retail distribution system employed; and (3) the diversity of products. OPEI commented that the current generic Delegated Assembly Program fails to respond to each of these unique factors and would create totally impractical burdens (see §85.1713 and §1068.260). In turn, this would have a dramatic, adverse impact on both large and small outdoor power equipment manufacturers resulting in the elimination of many equipment models.

EMA commented that the Small SI engine and equipment industries have specific needs regarding delegated assembly that have been appropriately balanced with the regulatory requirements as specified in §1054.610 of the proposal along with the other changes recommended by EMA in this section. EMA commented that the final rule should not integrate these requirements with the general provisions prescribed in 40 CFR Part 1068, but should rather retain their independence in Part 1054.

Written confirmation:

OPEI commented that the regulations need to allow a small engine manufacturer to obtain written confirmation (within 30 days after shipping engines) that his OEM customer has ordered the appropriate catalysts as part of the initial shipment -approval process for delegated engines.

EMA commented on §1054.610(c)(9) "What is the exemption for delegated final assembly?" EMA commented that the proposed requirement is not viable. An engine manufacturer cannot "have written confirmation . . . for an initial shipment of engines..." and also ". . . receive the written confirmation within 30 days of shipment." Accordingly, EMA commented that the language should be revised to read as follows: "You must advise the equipment manufacturer that (i) written confirmation that the appropriate aftertreatment has been ordered is required within 30 calendar days of the initial engine shipment for a given model year; and (ii) if written confirmation is not received future engine shipments will not be allowed. The equipment manufacturer can meet the written confirmation requirement by notification to the engine manufacturer that engines will be used under the equipment manufacturer flexibility program defined in 40 CFR Part 1054.625."

Audits:

OPEI commented that engine manufacturers' audits of their respective OEM production practices (and confirmation that products meet the certified configuration) can be effectively accomplished in many different ways. The regulatory requirements should not constrain the options an engine manufacturer may utilize. OPEI commented that the final program should allow the small engine manufacturers to conduct audits of either the OEM's production process or his final assembled products (pursuant to EPA's proposal).

EMA commented that there are many different ways an engine manufacturer can effectively audit an OEM's production practices and confirm that products meet the certified configuration. The regulatory requirements should not place undue restraint on the engine manufacturer's ability to use the many viable options available. In order to accommodate the wide variety of engine manufacturer/OEM business relationships, the auditing requirements must be flexible. Each engine manufacturer has a variety of OEM customers ranging from the very sophisticated large business (where engine orders/deliveries are coordinated with equipment build schedules for just in time production) to small companies that may only place a single order each year. EMA commented that requiring certification documentation of all the various options an engine manufacturer may utilize is burdensome and ineffective. Certification documentation should be limited to an acknowledgement from the engine manufacturer of the need for the required audits and its intent to utilize the delegated assembly provisions.

EMA commented on §1054.610(c)(10) "What is the exemption for delegated final assembly?" The requirement to select individual equipment manufacturers equally among the volume quartiles is overly prescriptive with no added benefit to the environment. EMA commented that this section should be revised in order to provide for selection of equipment manufacturers from each quartile as much as possible. This will allow engine manufacturers to select equipment manufacturers for auditing based on their confidence in the equipment manufacturers processes.

Point of final assembly:

OPEI and EMA commented that the "point of final assembly" (when the exemption no long applies) will vary depending on the equipment manufacturer production process. Engines that are scheduled to be utilized in one equipment model may be pre-assembled with the expected exhaust system. Due to production-demand changes, these engines may be returned to inventory with the intent of later assembly only to be reconfigured at a later date for installation into different equipment. This may result in the exhaust system being replaced. For purposes of determining whether an exemption has expired, OPEI commented that the "point of final assembly" should be defined as the point at which the final equipment is totally complete and ready to be introduced into commerce.

Labeling:

OPEI commented that if there are provisions required for the designation of Delegated Assembly engines on the emission compliance label, OPEI supports the use of an identifying mark on the permanent label, such as "DA" as an approved abbreviation for "Delegated Assembly."

CARB recommended a change to the proposed labeling requirements. EPA is proposing a partially completed label (temporary label) be placed by the engine manufacturer which would subsequently be replaced by a final permanent label by the equipment manufacturer upon completion of delegated assembly. Since the engine manufacturer is ultimately responsible for the final assembly and product as the holder of the Executive Order (in California) and Certificate of Conformity (federally), CARB recommended requiring the following:

Option 1: The engine manufacturer applies a partial permanent label, and following delegated assembly, the equipment manufacturer adds a supplemental permanent label (placed just below the original label) completing the labeling requirement. This procedure is similar to the approach used for rebuilt/replacement off-road compression-ignition engines.

Option 2: The engine manufacturer applies a complete permanent label and ships the incomplete engine to the equipment manufacturer who subsequently completes the delegated assembly. This option would have an added requirement that the engine manufacturer must demonstrate, as part of the certification process, that there are quality control procedures in place to ensure that the final assembly occurs correctly.

Production-line testing:

OPEI and EMA commented that engine manufacturers should be allowed flexibility regarding the equipment manufacturer supplied exhaust systems required for PLT testing, including the ability to inventory randomly selected samples for future PLT testing requirements.

EMA commented on §1054.610(c)(12) "What is the exemption for delegated final assembly?" EMA commented that this section should be revised in order to clarify that engine manufacturers may inventory equipment manufacturer supplied exhaust systems for production line testing, provided that such systems are randomly selected components that are representative of equipment manufacturer production.

Class I engines:

OPEI and EMA commented that Class I engines are generally sold complete with the engine manufacturer supplied exhaust system. However, there are a limited number of specialty products where this is not possible. Some Class I products have all of the same equipment manufacturer/customer demands that are necessary to provide a Delegated Assembly option for the larger Class II engines. OPEI and EMA commented that these Class I products should not be precluded from this required flexibility based only on their respective class.

Liability:

EMA commented that engine manufacturers utilizing the delegated assembly provisions and meeting all specified requirements (e.g., provide the equipment manufacturer with all information necessary to complete the engine assembly to it's certified configuration, and conduct the required audits) must be assured that the equipment manufacturer is responsible for delivering compliant product into commerce.

Honda noted that the NPRM takes the position that the engine manufacturer, as the engine certifying party, becomes responsible for the actions of the equipment manufacturer, an independent business. The NPRM essentially appoints the engine manufacturer to be the "Selective Enforcement Authority" and to perform audits of the equipment manufacturer as though the engine manufacturer were a government agency with authority to enter a business and inspect records. Honda does not believe EPA intends to relinquish its independent enforcement authority nor does Honda believe it is reasonable to ask the equipment manufacturer to submit, by contract or otherwise, to inspection by competing engine manufacturers, all of whom sell to his competitors, and in some instances produce the same type of product within their own company or a wholly owned subsidiary. Honda also noted that the NPRM states that the equipment manufacturer must follow the engine manufacturer's instruction or the equipment is not covered by the certificate of conformity and not legal to introduce into commerce.

Air filters:

EMA commented on §1054.610(e) "What is the exemption for delegated final assembly?" EMA commented that manufacturers must have the ability to certify engines without identifying a specific part number for the air filter. This ability must either be specifically incorporated into the regulatory language, or included in a clarifying regulatory support document. Current Certification Guidance and submission templates require inclusion of air filter part numbers as a condition of certification. However, this section would allow engine manufacturers to provide a definitive parameter, such as intake restriction range, to define the certified configuration. Therefore, equipment manufacturer installed intake systems meeting the engine manufacturer prescribed parameter would not be subject to these provisions.

References:

EMA commented on §1054.610(g)(2) "What is the exemption for delegated final assembly?" EMA commented that §1054.610(g)(2) includes an incorrect reference to paragraph (g)(2). This reference should be corrected to refer to paragraph (g)(1).

Within-company shipments:

EMA commented on §1054.610(m) "What is the exemption for delegated final assembly?" EMA noted that as set forth in §1054.610(d), engine manufacturers that install engines into equipment are not required to request an exemption or take any other extraordinary steps in order to do so. Likewise, engine manufacturers should be allowed to complete production of engines at different facilities without being required to request an exemption. Accordingly, EMA commented that this section should be deleted.

Evaporative systems:

EMA commented on §1054.610 "What is the exemption for delegated final assembly?" EMA commented that this section should be revised to add a provision similar to §1054.610(c) that would apply to the situation where an engine manufacturer certifies compliance to the evaporative standards and delegates final assembly of the evaporative system to the equipment manufacturer. Such a provision is of particular importance to small equipment manufacturers that cannot use fully integrated engines and do not have the resources to design and certify pursuant to the 40 CFR Part 1060 requirements.

Letters:

Commenter	Document #
OPEI	0675
CARB	0682
EMA	0691
Honda	0705

Our Response:

General:

As noted in the proposal and in the comments, we have already adopted delegated-assembly provisions for heavy-duty highway engines in part 85 and for nonroad engines in part 1068 in addition to what we proposed for Small SI engines in part 1054. We have made a comprehensive review of these various regulations to create a hybrid program that allows us to take what we believe is a robust approach that uniformly and broadly addresses the concerns related to the cooperative efforts of engine, equipment, and component manufacturers in designing and assembling certified systems. The combined approach, which incorporates elements of each of the three programs, is written in a new §1068.261. There is also an abbreviated version of §1068.260 remaining to describe a framework and general provisions related to the arrangements between engine and equipment manufacturers in taking engines through the assembly process to reach a certified configuration. Section 1.xx describes the approach we took to creating this unified program. The rest of this section describes how the final program differs from the proposal and responds to the specific concerns related to Small SI engines and equipment raised in the comments.

There are three principal differences between the proposed and final regulations for Small SI engines and equipment. First, we are allowing distributors to participate in delegated assembly, but distributors would need to act as equipment manufacturers, adding catalyzed mufflers where appropriate for shipment to equipment manufacturers. We proposed to allow distributors to act as agents on behalf of engine manufacturers to further delegate assembly to equipment manufacturers. We are allowing this only for the first four years of the Phase 3 standards (2011 through 2014 model years). While a more flexible approach is needed for the transition to new standards, as described above, we believe this is not appropriate for the long term because of concerns about the ability of engine manufacturers to ensure that engines will be assembled in the certified configuration. As described in the comments, assembling engines involves a very significant effort to differentiate different models and manage engines and components coming from multiple suppliers. We believe that there is too much risk of miscommunication or misbehavior where a distributor is acting on behalf of the engine manufacturer to do design work, arrange for shipment, and manage audits and other oversight steps to ensure that potentially large numbers of very small equipment manufacturers properly assemble engines. Given the complexity and diversity of these arrangements, we expect that the question would be how extensive the noncompliance is, not whether there would be noncompliant engines. Such problems would be difficult to find and, if we do discover a problem, it would be difficult to hold any particular company accountable, given the distribution of responsibility among the several companies. Nevertheless, we expect to learn a lot from the experience of implementing these provisions. If we see that manufacturers can observe the regulatory requirements in a way that alleviates the concerns described here, we would be open to a regulatory amendment to continue the provisions related to distributors that we are adopting on an interim basis.

We understand that some companies will be too small to get an engine manufacturer to agree to participate in delegated assembly for some or all of their equipment models. In these cases, we believe distributors will in many cases be able to provide design support for the equipment manufacturer. Small equipment manufacturers could benefit from a distributors ability to participate in delegated assembly, but only to the extent that the distributor can coordinate muffler designs with the muffler manufacturer, the engine manufacturer, and the equipment manufacturer. Distributors often serve an important role in helping small equipment manufacturers with system integration to properly install engines and to maximize the performance of the equipment to match the engine's design parameters and specifications. Allowing distributors to participate in delegated assembly would be a natural fit with this role. We also recognize that some equipment manufacturers would have such small volumes or distinct equipment parameters t that they would not benefit from this limited role of distributors in delegated assembly. As a result, these companies would need to redesign their equipment as needed to be able to use one of the stock muffler configurations available from the engine manufacturer or distributor. As noted above, we believe this is achievable by the time the transition provisions expire in 2015.

Second, the final rule requires that audits minimally involve inspection of assembly procedures and production records, investigation of assembled engines, and confirmation that the number of aftertreatment devices shipped were sufficient for the number of engines produced. The proposal specified that an audit could include any one of these three things. As described above, we are concerned that insufficient oversight would lead to a situation where equipment manufacturers assemble engines such that they are not in their certified configuration, either as a simple mistake or to take advantage of the discretion allowed to get away with changes that reduce costs or change design parameters for some performance advantage. We believe the three activities noted are basic steps that should be part of any audit. Moreover, we specifically identify these as minimum steps for performing an effective audit. If we learn over time that these steps are insufficient, either for specific manufacturers or the industry as a whole, we may require additional auditing steps to ensure that engines are properly assembled.

A current enforcement case highlights the need for active oversight with delegated assembly. An engine manufacturer has been relying on installation instructions to ensure that equipment manufacturers install the proper air filter, which is identified specifically by part number in the application for certification. It turns out that an equipment manufacturer was found to be substituting a different air filter for some perceived advantage, either for cost or performance, which caused the engines to be sold in an uncertified configuration. The engine manufacturer had taken steps to make the information available to equipment manufacturers, but this was clearly not enough to ensure that final assemblies involved only engines in a certified configuration. In anticipation of engines using catalyzed mufflers, we see the incentive for departing from an engine manufacturer's installation instructions only increasing. We therefore believe that delegated assembly can be successfully done only with an active program to oversee and document compliance with installation instructions.

Third, we specify a different schedule for the number of audits that engine manufacturers must perform after the first four years. In fact, the change involves a smaller number of audits, based on our expectation that a smaller number of equipment manufacturers will be participating in delegated assembly after the transition to the Phase 3 standards is complete.

The following paragraphs respond to the individual concerns expressed in the comments.

Written confirmation: OPEI's suggestion is consistent with our proposal. The final rule preserves this provision, not only for small businesses but for all companies.

We believe this requirement is quite clear and viable, reflecting the need for confirmation with the business realities of ordering and shipping engines. In particular, we believe it is not sufficient for equipment manufacturers to satisfy the requirement for written confirmation simply by notifying the engine manufacturer that they are aware of the regulatory requirements. This requirement is in the context of a scenario in which the equipment manufacturer is separately procuring and paying for aftertreatment devices. There is a substantial risk for engine manufacturers to send out noncompliant products without this assurance, so we believe engine manufacturers would want to treat the regulatory requirement as a minimum for ensuring that their engines do not reach ultimate purchasers in an noncompliant configuration.

Audits: In a situation where delegated assembly does not require engine manufacturers to include the price of aftertreatment with the price of the engine, we are concerned that there is too great an incentive for equipment manufacturers to deviate from the specified installation instructions, either to reduce costs or to gain some perceived performance advantage. As described above, we believe an effective audit that minimally includes the three elements specified under the current regulations in §1068.260 is essential for maintaining proper oversight of the assembly process. The application for certification should include enough information to make clear that the certifying engine manufacturer will properly fulfill its auditing responsibilities.

We believe it is appropriate for engine manufacturers to follow an auditing plan that involves reasonably objective directions for selecting equipment manufacturers. Adding "as much as possible" to this direction would make it meaningless. As noted by EMA, certain equipment manufacturers will have earned more or less confidence based on their relationship with the engine manufacturer and their past performance. Allowing engine manufacturers more discretion in this regard would only allow them to delay auditing equipment manufacturers for which there is less confidence that everything is in order. If engine manufacturers are particularly concerned about any one equipment manufacturer, they should be sure to audit that company independent of the specific regulatory requirements, or simply terminate the arrangement for that company.

Point of final assembly: We specified in the proposal that the exemption expires at the point of final assembly because there is a need to avoid a situation in which a delegated-assembly engine is introduced into commerce in an uncertified configuration where we would not want to consider that a violation. The exemption therefore covers a shipment from the engine manufacturer to the equipment manufacturer (or from one of the equipment manufacturer's facilities to another). There is no need for an exemption for other internal processes after the equipment reaches the point of final assembly, because its engine needs to be in a certified configuration the next time it is introduced into commerce. There is no violation for an engine that is placed into inventory at the end of the assembly line and then pulled back for trading out exhaust components to be in a different certified configuration. Note however, that if an EPA inspection of an equipment manufacturer's inventory of completed products turns up engines that are not in a certified configuration, we would take steps to address the nonconformity, as allowed under the regulations.

Label: We agree that abbreviating "Delegated Assembly" may be appropriate, so we are revising the regulation to allow labels with "DEL ASSY" where space prevents the full designation. Especially with the approach we are taking for labeling with respect to evaporative emission families, further abbreviating the term would only be confusing or inappropriate.

The proposed rule included labeling requirements consistent with CARB's second recommended option. We are adopting similar labeling requirements for the final rule, including the option of either applying a temporary label or identifying "delegated assembly" on the permanent label. This ensures that the engine will be properly identified at every point in the assembly (and shipping) process. We believe equipment manufacturers should not be responsible for labeling engines where they are simply assembling the exhaust system.

Production-line testing: We agree that manufacturers should be able to maintain an inventory of randomly selected components for testing. We have revised the regulations accordingly.

Class I engines: We agree that engine manufacturers may need to use the delegated-assembly provisions for Class I engines, though this should be far less common than for Class II engines. We are therefore preserving this provision in the final rule.

Liability: The regulations appropriately state that engine manufacturers are liable for the in-use compliance of every certified engine. The delegated-assembly provisions are an option that engine manufacturers may exercise based on their business interests and their relationships with equipment manufacturers. Choosing to use these provisions does not change the fundamental responsibility associated with certifying engines, to ensure that engines comply with the regulations throughout the useful life. In addition, the regulations also make clear that equipment manufacturers are in violation if they introduce equipment into commerce without following the engine manufacturer's installation instructions.

If an equipment manufacturer has been found to be in violation, we specify that we may require the engine manufacturer to discontinue the use of delegated assembly for that manufacturer (revoking the exemption). We would generally not hold engine manufacturers responsible for noncompliant engines where the equipment manufacturer is fully responsible for the noncompliance. However, we would hold engine manufacturers in violation if they intentionally submitted false or incomplete information (voiding the exemption).

Honda correctly notes that we are not surrendering our enforcement authority with respect to delegated assembly. However, we have described our basis for being concerned that engine manufacturers do more than simply send incomplete engines with installation instructions, trusting equipment manufacturers to properly complete engine assembly subject to EPA's enforcement of applicable requirements. Delegated assembly is fully optional, so any engine or equipment manufacturers not wanting to be subject to the required oversight functions, or not wanting to be in a situation where confidential business information would be compromised, may choose not to participate in delegated assembly. Engine manufacturers could also take the middle ground, participating in delegated assembly but including the price of aftertreatment in the price of the engine. In this case, the regulations specify a significantly lighter oversight burden. Since the engine manufacturer is choosing to participate in delegated assembly, it is unclear why there would be any thought that they should take steps to ensure that engines are assembled properly. Third-party auditors could do on-site visits if there is a sensitivity regarding access to a competitor's facilities or records. Moreover, we specifically state in the regulation that information submitted between companies under these regulatory provisions is considered to have been equivalent to a submission to EPA. The prohibitions in §1068.101 and the corresponding civil and criminal penalties apply for any false information that a company submits to another company.

Air filters: The regulations include the clarifying language requested by EMA in which we specify that air filters are subject to the delegated-assembly requirements only if the manufacturer's certification depends on identifying the air filter by part number. In contrast, if the manufacturer certifies an engine based on specified intake restrictions, the delegated-assembly provisions do not apply. In this scenario, the engine manufacturer would still be responsible for the in-use compliance of any engines in the engine family that were assembled following the applicable installation instructions.

References: We have revised the regulations such that this reference is obsolete.

Within-company shipments: The final regulations include the streamlined provisions for engine manufacturers that also manufacture equipment and install their own engines.

Deleting the provisions related to completing production at different facilities would disallow this practice entirely. We need to be aware of this practice and to be able to set conditions or require specific steps to ensure that the exemption is not abused. We therefore need to base this exemption on EPA approval; however, we specify that the manufacturer must simply describe this practice in the application for certification. Approving the certification is considered approval of the exemption. We are therefore retaining this provision as proposed.

Evaporative systems: Engine manufacturers must comply with evaporative emission standards to the extent they assemble fuel-system components. They are not responsible for further assembly of the fuel system by equipment manufacturers so there is no need for an exemption or other provisions analogous to delegated assembly.

2.9 Equipment manufacturer recertification

What Commenters Said:

OPEI supported EPA's proposal to allow the re-certifying equipment manufacturers to: 1) only conduct low-hour emission testing on the "green" modified exhaust system; and 2) rely on and apply the engine manufacturer's previously established deterioration factors. OPEI commented that EPA has also appropriately proposed not to apply PLT testing to the re-certifying OEM as this would overly-complicate this process without any benefits since the engine would already be subject to PLT. OPEI commented that this re-certification provision should be permanent and not expire. OEMs will still require muffler certifications on a long-term basis to produce certain critical equipment models.

Regarding equipment manufacturer recertification, CARB believes that such a provision would conflict with anti-tampering regulations. CARB commented that an alternative would be the equipment manufacturer working with the engine manufacturer (holder of the executive order) to include his/her variation as a running change and re-testing for a new worst-case model/configuration. However, if EPA does adopt the provision to allow equipment manufacturer recertification, CARB commented that EPA should require production line testing and impose an expiration date for the program.

Letters:

Commenter	Document #
OPEI	0675
CARB	0682

Our Response:

We agree that there may be a continuing need for equipment manufacturers to rely on the streamlined certification proposed in §1054.612 where they rely on a catalyst from an already-certified engine family. The streamlined certification would allow the equipment manufacturer to assemble that catalyst in a custom muffler configuration. We believe this situation calls for a reduced certification burden, especially for developing deterioration factors.

We also believe that there will be a reduced need for this as time passes. As described above, the four-year transition program should allow time for engine and equipment manufacturers to work out arrangements for designing and producing mufflers in compliant configurations. As a result, we believe it is appropriate to limit the provisions for streamlined certification starting in 2015. In discussion with manufacturers, there was general agreement that an appropriate threshold would be annual sales of 5,000 units, which is already established as the threshold for defining small-volume engine families.

There is no violation of the tampering prohibition because the engine would never be introduced into U.S. commerce in an uncertified configuration.

We agree that changes coming in response to an equipment manufacturer's needs could be factored in as a running change for the certifying engine manufacturer (with new testing as needed). This would require no new regulatory provisions; however, the proposed approach addresses the situation where the engine manufacturer does not want to be responsible for the changes called for by the equipment manufacturer.

We will monitor the use of this provision over time, both for its frequency of use and the degree of compliance. We may choose to discontinue the streamlined recertification provisions in the future, but we believe there is enough chance that equipment manufacturers will depend on it that it can be appropriately applied beyond 2014 for small-volume emission families as described above.

2.10 Compliance provisions

2.10.1 Warranty assurance

What Commenters Said:

OPEI and EMA noted that the proposal implements a change in the requirements for manufacturers to provide emission warranty service including provisions that deal with people living more than 100 miles from an authorized service center starting in 2009 model year. OPEI and EMA understand the agency's concern that customers must have access to sources of emission warranty but they do not support the prescriptive solution associated with authorized service centers within 100 miles of every customer. It will be virtually impossible for engine or equipment manufacturers to identify where the ultimate purchaser of a piece of equipment may use the equipment and therefore impossible to properly identify for the agency that the requirement has been met. The relief purported to be provided regarding sparsely populated areas is also not viable. If any provision is required beyond the need for at least one distributor within the United States, OPEI and EMA recommended that the servicing dealer requirement be linked to population centers with a 2000 U.S. Census population in excess of 100,000 people. (See §90.1103 Emission warranty, warranty period and §1054.120(f)(3) and (4) What emission-related warranty requirements apply to me?)

CARB supported EPA's "Special Provisions for Compliance Assurance," and specifically supported the provisions regarding the assurance of warranty coverage.

Letters:

Commenter	Document #
OPEI	0675
CARB	0682
EMA	0691

Our Response:

Certifying manufacturers must not only sell a product that meets emission standards, but also meet obligations over a defined period of service. The most obvious requirements related to in-use engines are warranty and recall. We are aware that many low-cost engines are sold by foreign manufacturers with little or no presence in the U.S. market for honoring warranty claims. This is a violation of the regulations, subject to substantial penalties. We believe it is very important to take the preventive step at certification to have companies describe their plan for meeting warranty obligations than to wait until there is a violation. The proposed approach was an attempt to reasonably balance a consumer's need to be able to access an authorized service center with the manufacturer's burden to maximize coverage with their repair facilities.

We believe it is clearly necessary to require more than a single parts distributor in the United States to expect a manufacturer to be able to provide effective warranty coverage for consumers. We agree with the approach recommended by the manufacturers to say that they can demonstrate adequate warranty coverage by placing authorized service centers in all U.S. population centers with a census count of 100,000 or more. Table 2-1 identifies 251 areas from the 2000 census that qualify, listed alphabetically by state. We have modified the regulations to allow for this demonstration.

We are also aware that some companies may not sell engines throughout the United States, in which case they would not be expected to maintain authorized service centers in all the identified population centers. We are keeping a modified version of the proposed requirement as an alternative to the commenters' suggestion to rely on the list of population centers. This would allow manufacturers to choose from a variety of methods for demonstrating an ability to respond to warranty claims.

We are adopting two main changes to the proposed approach related to warranty demonstrations. First, we are clarifying that the distance from consumers is based only on the contiguous United States. This allows us to avoid an expectation that manufacturers maintain multiple service centers across Alaska or in every U.S. territory. Second, we are revising the provisions related to sparsely populated areas. While the proposal allowed for up to 10 percent of sales to be to owners living more than 100 miles from an authorized service center, we agree that this would be difficult for manufacturers to implement. We are instead specifying that the 100-mile limit does not apply in states with any high-altitude areas (see 40 CFR part 1068, Appendix III). Identifying states with high-altitude areas aligns quite closely with low population density.

To the extent that the 100-mile approach or the population centers doesn't fit well nationwide for a given manufacturer, we would also allow for a combined approach in which the manufacturer would rely on one method for certain states and another method for other states. However, we would require each state to have at least one authorized service center unless the manufacturer is able to meet the 100-mile specification without having an authorized service center in a given state.

Also, we proposed to apply these requirements in the 2009 model year, but we believe the timing of the final rule dictates that we allow an additional year for manufacturers to meet these new requirements. We have therefore modified the regulations to require manufacturers to comply starting with the 2010 model year.

Table 2-1
U.S. Population Centers over 100,000 – U.S. Census, 2000*

Birmingham, AL	San Francisco, CA	South Bend, IN	Toledo, OH
Huntsville, AL	San Jose, CA	Cedar Rapids, IA	Norman, OK
Mobile, AL	Santa Ana, CA	Des Moines, IA	Oklahoma City, OK
Montgomery, AL	Santa Clara, CA	Kansas City, KS	Tulsa, OK
Anchorage, AK	Santa Clarita, CA	Olathe, KS	Eugene, OR
Chandler, AZ	Santa Rosa, CA	Overland Park, KS	Portland, OR
Gilbert, AZ	Simi Valley, CA	Topeka, KS	Salem, OR
Glendale, AZ	Stockton, CA	Wichita, KS	Allentown, PA
Mesa, AZ	Sunnyvale, CA	Lexington-Fayette, KY	Erie, PA
Peoria, AZ	Thousand Oaks, CA	Louisville-Jefferson County, KY	Philadelphia, PA
Phoenix, AZ	Torrance, CA	Baton Rouge, LA	Pittsburgh, PA
Scottsdale, AZ	Vallejo, CA	Lafayette, LA	Providence, RI
Tempe, AZ	Visalia, CA	New Orleans, LA	Charleston, SC
Tucson, AZ	West Covina, CA	Shreveport, LA	Columbia, SC
Little Rock, AR	Arvada, CO	Baltimore, MD	Sioux Falls, SD
Anaheim, CA	Aurora, CO	Boston, MA	Chattanooga, TN
Antioch, CA	Colorado Springs, CO	Cambridge, MA	Clarksville, TN
Bakersfield, CA	Denver, CO	Lowell, MA	Knoxville, TN
Berkeley, CA	Fort Collins, CO	Springfield, MA	Memphis, TN
Burbank, CA	Lakewood, CO	Worcester, MA	Nashville-Davidson, TN
Chula Vista, CA	Pueblo, CO	Ann Arbor, MI	Abilene, TX
Concord, CA	Thornton, CO	Detroit, MI	Amarillo, TX
Corona, CA	Westminster, CO	Flint, MI	Arlington, TX
Costa Mesa, CA	Bridgeport, CT	Grand Rapids, MI	Austin, TX
Daly City, CA	Hartford, CT	Lansing, MI	Beaumont, TX
Downey, CA	New Haven, CT	Sterling Heights, MI	Brownsville, TX
El Monte, CA	Stamford, CT	Warren, MI	Carrollton, TX
Elk Grove, CA	Waterbury, CT	Minneapolis, MN	Corpus Christi, TX
Escondido, CA	Washington, DC	St. Paul, MN	Dallas, TX
Fairfield, CA	Cape Coral, FL	Jackson, MS	El Paso, TX
Fontana, CA	Clearwater, FL	Independence, MO	Fort Worth, TX
Fremont, CA	Coral Springs, FL	Kansas City, MO	Garland, TX
Fresno, CA	Fort Lauderdale, FL	Springfield, MO	Grand Prairie, TX
Fullerton, CA	Gainesville, FL	St. Louis, MO	Houston, TX
Garden Grove, CA	Hialeah, FL	Lincoln, NE	Irving, TX
Glendale, CA	Hollywood, FL	Omaha, NE	Laredo, TX
Hayward, CA	Jacksonville, FL	Henderson, NV	Lubbock, TX
Huntington Beach, CA	Miami, FL	Las Vegas, NV	McAllen, TX
Inglewood, CA	Miami Gardens, FL	North Las Vegas, NV	Mesquite, TX
Irvine, CA	Miramar, FL	Reno, NV	Pasadena, TX
Lancaster, CA	Orlando, FL	Manchester, NH	Plano, TX
Long Beach, CA	Pembroke Pines, FL	Elizabeth, NJ	San Antonio, TX
Los Angeles, CA	Port St. Lucie, FL	Jersey City, NJ	Waco, TX
Modesto, CA	St. Petersburg, FL	Newark, NJ	Wichita Falls, TX
Moreno Valley, CA	Tallahassee, FL	Paterson, NJ	Salt Lake City, UT
Norwalk, CA	Tampa, FL	Albuquerque, NM	West Valley City, UT
Oakland, CA	Athens-Clarke County, GA	Buffalo, NY	Alexandria, VA
Oceanside, CA	Atlanta, GA	New York, NY	Arlington CDP
Ontario, CA	Augusta-Richmond County, GA	Rochester, NY	Chesapeake, VA
Orange, CA	Columbus, GA	Syracuse, NY	Hampton, VA
Oxnard, CA	Savannah, GA	Yonkers, NY	Newport News, VA
Palmdale, CA	Honolulu, HI	Cary, NC	Norfolk, VA
Pasadena, CA	Boise City, ID	Charlotte, NC	Richmond, VA
Pomona, CA	Aurora, IL	Durham, NC	Virginia Beach, VA
Rancho Cucamonga, CA	Chicago, IL	Fayetteville, NC	Bellevue, WA
Richmond, CA	Joliet, IL	Greensboro, NC	Seattle, WA
Riverside, CA	Naperville, IL	Raleigh, NC	Spokane, WA
Roseville, CA	Peoria, IL	Winston-Salem, NC	Tacoma, WA
Sacramento, CA	Rockford, IL	Akron, OH	Vancouver, WA
Salinas, CA	Springfield, IL	Cincinnati, OH	Green Bay, WI
San Bernardino, CA	Evansville, IN	Cleveland, OH	Madison, WI
San Buenaventura (Ventura), CA	Fort Wayne, IN	Columbus, OH	Milwaukee, WI
San Diego, CA	Indianapolis, IN	Dayton, OH	

*Source: U.S. Census Bureau (see http://www.demographia.com/db-usmuni2004.htm)

2.10.2 Bonding

What Commenters Said:

OPEI noted that its members are facing an enormous threat from manufacturers of non-compliant engines – particularly as the costs increase to produce even cleaner, EPA-compliant products. The current EPA framework is not designed with the safeguards needed to address the imminent threat from "bad actors" with no U.S. assets. Certain off-shore manufacturers have become very sophisticated in relying on "shell importers” in order to avoid any meaningful enforcement exposure.

OPEI commented that the final Phase 3 small engine regulations should require a foreign manufacturer (that has no U.S. assets) to post a bond to cover a portion of his engines in case they do not comply with the EPA emission standards. These bonding requirements are really the only meaningful mechanism EPA has to take action against a "bad foreign actor" who sells non-compliant engines through a "shell importer" and disappears if his non-compliant products are discovered. OPEI therefore supported EPA’s proposed bonding requirements for foreign manufacturers and importers with no U.S. assets to create an even and effective compliance and enforcement program. OPEI urged EPA to pull ahead and make effective in 2007 the bonding requirements.

OPEI commented that it does not believe it would be necessary or appropriate to impose such bonds on established manufacturers that have adequate U.S. assets to cover non-compliance events. Even with EPA’s new proposed, bonding requirements, manufacturers with substantial U.S. assets will still have dramatically greater compliance exposure (and incur greater costs) than a foreign manufacturer which just submits a bond.

OPEI commented that there should not be any other exemptions from the bonding requirements given the difficulty in defining an objective and practical criterion for preventing enforcement abuses. OPEI is skeptical that EPA can develop clear and objective regulatory language that would establish an exemption to the bonds for manufacturers that have a demonstrated long-term record of no violations. Moreover, OPEI is concerned that many manufacturers have previously certified engines, but not shipped any products into the U.S. market. Thus, the fact there has not been a known prior violation does not really indicate that such a manufacturer is a “responsible” company. OPEI also does not believe EPA will be able to establish clear and objective standards to exempt from the bonding requirements either manufacturers or importers who had been certified to voluntary industry standards for production quality (such standards do not currently exist) or who performed voluntary in-use testing. Deliberate “bad actors” intent on circumventing the regulations will be willing to also fabricate their compliance with production quality standards or voluntary in-use testing.

Euromot commented that, as importers, they accept the bonding requirements (or equivalent U.S. assets) and concept of a stronger market surveillance option within the proposed regulation.

CARB commented that it supports U.S. EPA's "Special Provisions for Compliance Assurance," and specifically supports the provisions regarding importation data, the assurance of warranty coverage, and bond requirements. The posting of bonds to cover compliance or enforcement-related obligations for importers who have not yet proven financial stability is crucial. Without the bonds, consumers may not be able to obtain needed warranty coverage. Also, if the imported engines are found not to meet the standards then enforcement actions can be made using the bond funds. Once a company gets into good financial standing, determined by EPA, then the company can be refunded the bond funds. Overall, CARB agreed with EPA that a bond requirement is necessary. However, CARB asked that in the proposed regulatory language EPA not preclude California from adopting a similar program should CARB deem it appropriate in the future for California certified engines.

Briggs & Stratton commented that it supports the bonding requirements in the NPRM. It is imperative for the small engine industry that all manufacturers are accountable for meeting the emission regulations, not just those located in the U.S. who are therefore susceptible to EPA enforcement actions. Companies with U.S. assets sufficient to cover enforcement actions should not be required to post import bonds, but companies without such U.S. assets should post bonds to ensure uniform enforcement for all manufacturers.

EMA supported the bonding requirements set forth in the NPRM. Such requirements are an important step to creating a level playing field among all competitors. Engine manufacturers that do not have sufficient assets in the United States to avoid the bonding requirement also are unlikely to have adequate resources in the U.S. to audit equipment manufacturer use of the delegated assembly provisions. Manufacturers that have significant physical assets in the United States can easily be identified, and EPA can take appropriate legal action as required when/if there is a compliance concern. EPA does not have access to manufacturers without assets in the United States, making it difficult, if not impossible, to take enforcement action against such entities. EMA commented that the proposed bonding provision correctly requires all parties responsible for compliance with the Phase 3 regulations to have assets in the U.S. (whether physical assets, or a posted bond) that may be attached in connection with an enforcement action. If the proposed bonding provisions are not adopted, EMA commented that it is imperative that EPA adopt another means to ensure that it has the ability to take enforcement action against manufacturers that do not have assets located in the United States. In addition, the enforcement provisions associated with Part 1054 and Part 1060 apply to any party that introduces product into commerce in the United States and EPA should exercise its authority accordingly.

EMA commented on §1054.690 "What are the bond requirements for importing certified engines and equipment?" EMA commented that the last part of the last sentence in paragraph (a) does not make sense as drafted. Accordingly, EMA suggested that the sentence should be revised to read as follows (new language is in italics): "For example, it would be a sufficient demonstration if you show that you have manufactured or imported engines for the U.S. market for a significant period of time *without failing a test conducted by EPA officials or being found to be substantially not in compliance with EPA regulations*."

The National Association of State Fire Marshals commented that their preliminary review suggests that the Chinese are capable of making a significant impact on the United States market.

They noted that they have seen this before, with Chinese manufactured All-Terrain Vehicles (ATVs) capturing over 30% of the U.S. market in just a few years. ATV's which they have tested, and provided to CPSC, failed to meet the applicable American National Standard and they recommended that they be recalled.

The National Association of State Fire Marshals commented that EPA's proposed Phase 3 Certification and compliance provisions are well suited for the legacy engine and equipment manufacturers that have an established track record for meeting EPA's Phase 2 requirements. They noted that EPA recognized the concerns with imported products, and their plans are noteworthy. However, new entrants from China can be expected to defy these provisions. Their experience enforcing CPSC regulations has shown that Chinese manufacturers and importers are willing to falsify conformance with CPSC regulations and to “port shop” until entry into the United States is achieved.

Letters:

Commenter	Document #
OPEI	0675
CARB	0682
Euromot	0649
Briggs and Stratton	0657
EMA	0691
National Association of State Fire Marshals	0673

Our Response:

We agree with the comments noting the need for bonding provisions to ensure that companies without substantial U.S. assets should be subject to bonding requirements to ensure enforcement with their obligations associated with certifying engines. Bond payments would allow EPA to compel companies to take actions or pay penalties where there might otherwise be no way of enforcing regulatory requirements. The bond payment would not apply for companies with substantial physical assets in the United States, since they are inherently subject to EPA’s enforcement of regulatory requirements because we have access to the company’s personnel and facilities to compel compliance or payment of penalties.

We also note that bonds are generally not paid in a lump sum and then refunded after some period. Rather, companies pay a premium to a bond agent who then opens a policy or account with a face value equal to the amount of the bond obligation, much like an insurance policy. Any EPA judgments against the company would generally be paid by the bond agent out of the account. As a result, the expense for maintaining a bond is simply the regular premium for maintaining a valid bond.

We are not including in the regulation any provision that would preclude California from adopting its own requirements for bond payments. However, any bond requirements in California would need to conform with any prevailing legal authority related to international trade.

We believe that basing bond payments on adherence to industry standards such as ISO 14000 would not be effective in assigning bond responsibilities where that would be necessary or appropriate, as described in the comments. We also believe it would not be appropriate to simply waive bond requirements based on some measure of compliance history, though we are prepared to set a lower threshold as an asset test as described below.

In discussions following the end of the comment period, manufacturers made three recommendations regarding the implementation of a bond requirement. First, they pointed out that there should be a minimum bond value rather than relying only on the published per-engine bond values. This would prevent small-volume importers from being responsible for maintaining a bond whose value is too small to provide any reasonable assurance of compliance or any practical ability to cover possible financial judgments if the company or its products are found to be in violation. We believe it would be necessary to require a bond value of $250,000 if the calculated value based on a per-engine calculation is less than that. This would ensure that the bond would cover a violation involving eight engines (or eight days where penalties are calculated per day). We believe any smaller bond value would be insufficient to achieve the objectives described above.

Second, manufacturers suggested $10 million of physical assets as a threshold value for determining whether a company has enough of a presence in the United States to avoid a bond payment. This would include any property to which the company possesses a clear title. The value of any given property should be based on a commercial appraisal. A mortgage or other debt obligation associated with the property would not affect the value with respect to determining whether bond requirements apply. We believe a $10 million threshold is high enough to avoid a situation where foreign manufacturers can make a token property investment to avoid bond payments, without imposing bond obligations on companies that have sufficient assets for demonstrating an ability to meet compliance and enforcement obligations. However, we believe smaller amounts would be appropriate for secondary engine manufacturers, where the capital investment for a given level of engine production may be much smaller as a result of the business practice of buying engines that are already nearly complete. We therefore believe $6 million is an appropriate threshold for secondary engine manufacturers. Also, we are aware that there is a reduced need for bond payments where companies have a consistent record of meeting their certification and compliance obligations. As such, we believe a reduced threshold of $3 million in U.S.-based assets is appropriate for companies that have certified for the previous ten years without being found in noncompliance.

Third, manufacturers pointed out that the bond payment should not be a condition of certification. We agree that manufacturers should not be required to post a bond before they certify their engines. However, we believe it is necessary for companies to describe in the application for certification why they should be exempt from the bonding requirements, if applicable. This would allow us to take any appropriate steps to verify claimed assets before importation, rather than trying to correct a problem after a violation occurs. If bond payments are required for a given manufacturer, the bond would need to be in place for any 2010 model year engines introduced into U.S. commerce on or after January 1, 2010.

2.10.3 Restricted model year

What Commenters Said:

Regarding restrictions related to naming model years, CARB commented that it believes it is reasonable to require that model year engines and equipment may be at most one year earlier than the calendar year of the importation during the change of the emission standards. Whichever requirements EPA chooses to adopt, CARB recommended that procedures be adopted to prevent any stockpiling of engines that could be used to circumvent the regulations.

EMA commented that the proposal's requirement that imported engines be identified by either model year of importation or one model year earlier is a viable and appropriate approach to preventing the stockpiling of older engines/equipment. However, given the seasonal nature of lawn and garden products, there are limited situations where the one year limitation could be too restrictive. Accordingly, EMA commented that EPA should give itself the authority to extend the time frame in special circumstances. (See §90.616 and §1054.695(b).)

In later comments, EMA suggested that we allow an additional year for products that were produced in the United States, exported, and subsequently are imported again into the United States.

Letters:

Commenter	Document #
CARB	0682
EMA	0691
EMA	0808

Our Response:

We are adopting the proposed provisions, as supported by the comments. We are not adopting the suggested allowance for approval under unique circumstances to allow a longer time frame to import products from earlier model years. We believe any such provision would invite any number of requests, each with unique circumstances. It is difficult to imagine a test that would allow us to establish a threshold that would appropriately differentiate legitimate requests from those that could or should have been avoided. In contrast, we believe the one-year allowance provides a generous amount of time to complete production for filling orders and shipping products to the United States.

While the allowance is for a one-year difference between calendar year and model year, it is important to clarify that 12 months is the minimum time interval that would apply. This would be the case, for example, for an engine produced in December 2009 with new emission standards applying for the 2010 model year. Manufacturers would then have twelve months for shipment to an equipment manufacturer for installation and importation into the United States (or importation of the loose engine). Especially with the awareness that new emission standards have taken effect, we believe this presents a reasonable deadline for manufacturers to complete their production and shipping to get products into the United States. If manufacturers end their model year before December of a given year, that would provide an additional margin for importing products by the end of the following calendar year. For products manufactured before the end of the model year, there would also be a correspondingly longer time until the importation deadline would apply.

We are aware that seasonal products may pose unique challenges. However, we are not adopting a requirement that products reach the ultimate purchaser by the end of the calendar year following the named model year. Rather, these products must simply be imported before the deadline applies. We would expect manufacturers, distributors, or dealers to maintain their normal inventories of unsold products at their facilities within the United States without regard to the importation deadline described here.

We believe it is also not appropriate to modify the regulation to accommodate products that are exported and are later imported. We believe this represents a rather unusual scenario, since it would be limited to products that are certified and labeled for current EPA standards even though they are exported. The engines or equipment would then need to be unused for more than a year before being sent back to the United States. Adopting such an exception would likely also be contrary to policy requirements related to international trade, since it would apply preferential treatment to domestically produced engines.

See Section 1.5.2 for a discussion of issues related to stockpiling engines and equipment.

2.10.4 Adding or changing governors

What Commenters Said:

EMA noted that the majority of all nonhandheld engines in this category have speed control governors, including engines used in small utility vehicles and go-carts. Because such engines have a high potential for over speed (operation at a speed higher than the intended design of the engine), such governor systems are critical to the safety and structural integrity of these engines. Parties that modify engines to replace or eliminate the use of an engine manufacturers speed control governor should be considered the manufacturer and should be held responsible for all aspects of the resulting product, including emissions compliance. In cases where an engine modification is an engine manufacturer approved configuration, the engine manufacturer must include this configuration in its determination of a worst case emission configuration for certification. Accordingly, EMA commented that no additional compliance determination should be required.

EMA commented on §1054.650 “What special provisions apply for adding or changing governors?” EMA noted that this section states that the special provisions in the section apply for engines that will not have constant-speed governors when installed in equipment. However, there is no definition of what constitutes a “constant-speed governor.” Accordingly, EMA commented that EPA must provide such a definition in order to provide manufacturers with the ability to determine when the special provisions apply.

Letters:

Commenter	Document #
EMA	0691

Our Response:

We disagree with the comment suggesting that manufacturers simply include the range of governor strategies in an engine family by testing the worst-case configuration. The duty cycles we specify address only constant-speed engine operation. This is typical of generators, lawn mowers, and most other types of equipment. However, there are certain applications for which there is a governor to prevent overspeed but otherwise allows for operation at a wide range of engine speeds. It is not possible for manufacturers to consider the in-use operation of these variable-speed engines as part of its certification demonstration because we provide no standardized procedure for quantifying the emissions effect of this different operation. We have adopted a requirement in §1065.10(c)(1) to address this kind of mismatch between an engine's in-use configuration (or operation) and that reflected in the certification test; this requires manufacturers to notify us of the mismatch and allows us to work out an alternate testing regimen to reconcile the discrepancy. We believe it is better to address this scenario directly in the regulations rather than attempting to resolve it over time under the provisions of §1065.10(c)(1). We could adopt a unique duty cycle for variable-speed engines. However, we believe these engines make up a very small portion of overall sales of Small SI engines and that it is therefore more appropriate at this time to require manufacturers to make an engineering demonstration that emission controls continue to work effectively at different engine speeds. We may pursue a different duty cycle in a future rulemaking if we find that this approach is not an effective way of addressing the concern.

We agree that we need clarifying language to make clear what the regulation means by referring to constant-speed governors and have revised the language accordingly.

We also agree with EMA's suggestion to disallow removal or modification of installed governors without recertifying the engine. We have revised the language in §1054.650 to reflect this change.

2.10.5 Competition exemption

What Commenters Said:

OPEI commented that it agreed with EPA's reasoning and logic for determining what a "competition" engine is and how to apply for exemptions for their sale and use.

Briggs and Stratton noted that in the current small engine regulations (40 CFR Part 90) an engine "Used solely for competition" is defined as ". . . exhibiting features that are not easily removed and that would render its use other than in competition unsafe, impractical, or highly unlikely" (40 CFR Part 90.3). In the Phase 3 proposal EPA is taking a different approach as described in the preamble on page 28140 in the Federal Register. The engines must meet all four of the listed criteria to be considered exempt based on use solely for competition. In order for new engines to be exempt per §1054.620 an engine manufacturer would have to annually apply for the exemption and provide the information as required by EPA.

Briggs and Stratton raised the following specific issues with regard to the proposal:

1. Manufacturers that make engines specifically designed for competition have made investments to develop a product to comply with the criteria under existing regulations. The proposed regulations in §1054.620 create additional certification requirements, business limitations, and recordkeeping burdens in addition to the investment already made to comply with the current regulations. Briggs and Stratton suggested that the regulations allow engine makers to either meet the new criteria in §1054.620(c) or the existing criteria, which is: "Used solely for competition means exhibiting features that are not easily removed and that would render its use other than in competition unsafe, impractical, or highly unlikely".

2. The criteria in §1054.620(c) are written assuming that only professional racing teams use small engines for competition. However, amateurs competing in sanctioned events do much of the competitive racing using small engines. Therefore, Briggs and Stratton commented that the limitation for sale to the general public in §1054.620(c)(1) is not practical and this requirement should be deleted.

3. The requirements to "document the ultimate purchaser" and "any equipment manufacturers requests for an exempted engine" in §1054.620(g) are not practical. As discussed above, amateurs that purchase engines through dealers serving the racing market perform much of the racing in sanctioned events. Dealers do not necessarily build the equipment but supply the parts used by amateur racers and engine/equipment builders that serve the racing market. Briggs and Stratton commented that §1054.620(g) should be modified to read: "If we request it, you must provide any information we need to determine whether the engines are used solely for competition. This would include any documentation regarding the number of engines and a list of the engine manufacturers' customers for these engines. Keep these records for five years."

4. Section 1068.235 allows engines to be modified for competition after they are placed into service, to be modified without request, and no record keeping of these engines is required by the original engine manufacturer. Briggs and Stratton commented that §1068.235 should clarify that this exemption should not be used to circumvent the requirements of 1054.620.

Letters:

Commenter	Document #
OPEI	0675

Our Response:

The existing definition under part 90 is very broad. Under the current program, manufacturers would need to show only that an engine or equipment has features that make noncompetition use impractical or unsafe. We believe this allows far too much discretion for manufacturers to claim product as being limited to competition purposes. There is also not any process under part 90 for EPA to review these determinations. We proposed a set of qualifying criteria and limitations and a corresponding process to approve a manufacturer's use of this exemption. We believe these changes are needed to prevent exempted or excluded competition engines from being used for noncompetition purposes. The proposed provisions are very similar to those proposed or adopted in our other programs.

The proposed criteria to qualify for the competition engines are explicitly not limited to professional racing teams. We proposed to allow for sales to "professional competition teams, professional competitors, or other qualified competitors." We also proposed an approval process in which we could approve a competition exemption for manufacturers who could provide clear and convincing evidence that an engine would be used solely for competition even if not all the proposed criteria would apply. With respect to displaying competition models for sale to the general public, we believe it is important to avoid a situation where "unqualified competitors" are led to believe that they can purchase competition engines. It is therefore appropriate to keep the proposed limitation to prevent the "display for sale" of competition models. Allowing manufacturers to offer competition models for sale to the general public would prevent EPA and manufacturers from ensuring that purchasers will limit their use of these engines to sanctioned racing events. Manufacturers or dealers may display competition models to promote noncompetition models where it is clear that the competition models are not for sale to the general public. Qualified competitors should not be dependent on a manufacturer's marketing to the general public to be able to find the engines and parts they need. We have modified the regulation to clarify that competition engines may be displayed at a public dealership, though they may not be displayed as a sales item.

We agree with the suggestion to clarify that the allowance to modify certified engines to be used solely for competition should not be used to circumvent the requirements that apply under §1054.620 or similar provisions in other standard-setting parts. We have modified the language in §1068.235 to reflect this change.

2.10.6 Alternate fuels

What Commenters Said:

OPEI and EMA supported EPA's proposal that parties converting engines from a certified configuration to a non-certified configuration (i.e., from gasoline to propane) be required to certify the final product. OPEI and EMA commented that such parties should also be required to either remove or cover the original certified engine manufacturer emission compliance label with their own emission compliance label. As prescribed by the regulation, the party that certifies the final product should assume all responsibility for emission warranty, either directly or by contract with the original engine manufacturer.

EMA commented on §90.1003(b)(3)(i) and said that the language does not make sense and must be clarified. Significant components removed in the conversion process, such as carburetors, are not reinstalled but replaced in the conversion process. EMA also commented on §90.1003(b)(3) (ii) and believes the reference to §1054.635 is incorrect. EMA commented that the correct reference should be to §1054.645.

Letters:

Commenter	Document #
OPEI	0675
EMA	0691

Our Response:

The regulatory language in §90.1003 already refers to replaced components, as suggested in the comment. However, we believe the wording should be revised to address this confusion. We have therefore revised the language in §90.1003 accordingly. The revised language also includes a corrected reference to §1054.645.

2.10.7 Hardship exemption

What Commenters Said:

OPEI strongly objected to EPA's suggestion in the preamble that the proposed hardship relief measures in the Phase 3 regulation could somehow moot the independent need for the equipment-transitional flexibility program described above. Both proposed elements are critical to the industry and to the effective implementation of the final program. Moreover, there is substantial risk and uncertainty that EPA would not grant hardship relief requested by an individual OEM, at least until it is too late. By the time a manufacturer is in such duress that he can demonstrate and obtain hardship relief, it will typically be too late for him to make the needed production changes to avoid substantial economic injury.

In its other regulatory programs, EPA has never indicated that the hardship relief was linked to, or somehow mooted the need for, the much broader, existing transitional flexibility programs for equipment manufacturers. This is because the hardship relief provisions are limited to extraordinary circumstances and require substantial administrative time and effort to obtain. For example, both the diesel engine regulations and the general provisions applicable to diesel engines, large spark-ignited engines (LSI), snowmobiles and off-road motorcycles include an independent hardship relief variance request for non-integrated equipment manufacturers. See §89.102(f); and §1068.255. For example, the Tier III and Tier IV diesel regulations allow for an additional 70% allowance for OEMS that demonstrate hardship relief. See §89.102(f) and §1039.625(m).

Letters:

Commenter	Document #
OPEI	0675

Our Response:

EPA agrees that the TPEM program and hardship provisions are both needed for the Phase 3 program. The hardship provisions are intended to help manufacturers that are facing economic hardship as a result of not being able to comply with the new standards. The criteria for qualifying for hardship are set at a relatively high level, which would likely be difficult for a manufacturer to demonstrate if they were having difficulty redesigning only a few of their equipment models. The TPEM program allows an equipment manufacturer to deal with the models which are difficult to redesign without having to demonstrate that the company would experience hardship without the relief. Therefore, EPA agrees that both the TPEM program and the hardship provisions are needed and is retaining both of them for the Phase 3 program.

2.10.8 Stockpiling provisions for engine manufacturers

What Commenters Said:

EMA shared that there is a general understanding that the inventory allowances described in §90.1003(b)(4) apply equally to engine manufacturers and equipment manufacturers. They also pointed out that it is not uncommon in the Small SI engine business for OEM's to order engines based on sales projections and then return engines or cancel orders after the engines are built if market conditions change.

In response to draft language that would clarify the extent to which we would accommodate extended inventories for engine manufacturers, EMA commented that this approach seemed acceptable, with a remaining concern that the provision should not focus on small engine families. Engine families can consist of a wide variety of engine models/configurations. A high-volume family may include all the various models a manufacturer produces of vertical-shaft single-cylinder engines with a given displacement. The various models or customer-specific features may be as significant as a different crankshaft or as minor as a different styling element. Just because the family is high-volume doesn't mean that engines with a specific customer feature will not be stranded due to unforeseen changes in the market. Changing engines once they are manufactured and placed into inventory range from moderately expensive (trading out external parts) to ridiculously expensive (exchanging crankshafts). EMA suggested the regulatory language should state: "We will generally allow maintaining extended inventories only for unforeseen changes in market demand."

Letters:

Commenter	Document #
EMA	0817

Our Response:

The issue raised by the commenters is being addressed by adding §1068.103(f) to explicitly prohibit stockpiling engines when new emission standards take effect and adding §1054.601(b) to explain how §1068.103(f) will apply for Small SI engines. The provisions of the new §1068.103(f) clarify that what is prohibited is for engine manufacturers to deviate from normal production and inventory practices to stockpile engines with a date of manufacture before new or changed emission standards take effect. This recognizes that typical production practices for most engine manufacturers involve engines remaining in the manufacturer's inventory for some time. For most engines (especially for larger engines), since it is not economical to maintain a significant number of engines in inventory long after the end of a model year, this inventory time would typically be no more than a few weeks.

However, Small SI engines can be kept in inventory for much longer times, especially for small volume engine models. Manufacturers noted other possible cases for such extended inventories. In response to these concerns, we are adding §1054.601(b) which describes how §1068.103(f) will apply for Small SI engines. This provision does not preclude manufacturers from keeping engines in inventory for long times. However, in recognition that normal Small SI practices can include keeping some engines in inventory for a *very* long time, §1054.601(b) will require that manufacturers obtain our approval to keep any engines in inventory for longer than 12 months. Such manufacturers would be required to show that keeping such extended inventories is consistent with its normal business practice. In addition, given the lead time provided when we adopt new standards, we are requiring the manufacturer to demonstrate that the extended inventory (beyond 12 months) is also necessary and could not have been avoided through prudent planning. Consider the following examples:

> *Example #1 – the manufacturer normally keeps certain small volume engines in inventory for up to three years.* In this case, the manufacturer would need to plan its production run of such engines so that it reasonably expected to not keep any of the engines in inventory for more than 12 months after the new standards took effect.
>
> *Example #2 – the manufacturer normally keeps engines in inventory for up to six months.* In this case, the manufacturer could keep the engines in inventory for up to six months after the new standards took effect without seeking EPA approval.
>
> *Example #3 – the manufacturer normally keeps engines in inventory for up to ten months, but receives a return of a large number of engines (unforeseen but consistent with its normal business practice) so that it will not use up its inventory for an additional four months.* In this case, the manufacturer could keep the engines in inventory for up to 12 months after the new standards took effect without seeking EPA approval. Engines remaining in inventory after 12 months could be scrapped, sold as replacement engines, exported, or covered under another applicable exemption. Alternatively, the manufacturer could ask to be allowed to sell the engines under its original certificate beyond the 12 month period.

It is worth noting that this 12 month limit is consistent with the provisions of §1068.360 which prohibit the importation of new engines and new equipment in any calendar year that is more than one year after the named model year.

2.10.9 Other issues under part 1068

What Commenters Said:

OPEI generally supported the proposed application of the Part 1068 Compliance Provisions to small engines. OPEI generally supported EPA's efforts to modify Part 1068 to accommodate the application of evaporative standards which create different compliance obligations – depending on whether the OEM certifies or merely installs a previously certified evaporative component. (OPEI commented that they would like to work with EPA to further simplify/clarify this program so the component suppliers and OEMs can more readily understand their obligations and liabilities.)

In response to EPA's request for comment on applying these proposed requirements for engine rebuilding and maintenance to the engines and vehicles subject to this rulemaking, OPEI commented that it believes EPA may be creating burdens on industry segments unaware of this rule and incapable of providing the amount of burdensome records required by this part. OPEI commented that EPA should exempt engines/equipment subject to part 1054 from this provision.

Letters:

Commenter	Document #
OPEI	0675

Our Response:

We agree that the provisions in part 1068 can and should apply broadly to engine categories, including Small SI engines.

We also agree that the recordkeeping provisions related to rebuilding should apply differently for handheld and Class I engines. Commercial rebuilding for these engines is quite rare. We are concerned that applying the recordkeeping requirements for these engines will not be very meaningful for EPA's oversight, and rebuilders could in many instances be unaware that their service has reached a point that would qualify as a rebuild and that recordkeeping requirements would therefore apply. These engines also generally have very simple systems for controlling emissions, so there is less of a need to carefully document part numbers for replaced components and other related records. We are therefore modifying the regulations to waive the recordkeeping requirement for engines with displacement below 225 cc. Note, however, that the underlying requirement to rebuild engines to the original certified configuration continues to apply. This requirement is simply an elaboration of the general prohibition against tampering with certified engines. Even small businesses rebuilding small numbers of small engines should not be exempt from the tampering prohibition.

In contrast, Class II engines (at or above 225 cc) are substantially more expensive and are much more likely to be used in commercial applications where commercial rebuilding can be expected to extend the engine's operating life. We believe that commercial entities rebuilding these engines can be expected to maintain a standard business practice involving more careful documentation of their work.

As described in Section 1.5.5, we believe this distinction for rebuilding engines below 225 cc should apply equally to all spark-ignition engines (including recreational vehicles and outboard marine engines).

2.11 Small business issues

What Commenters Said:

Although ECO believes that small volume engine manufacturers require flexibility to remain competitive in the market, ECO commented that it does not agree a complete pass on PLT testing is the correct approach. Instead, ECO encouraged EPA to develop an approach that maintains the integrity of the certification compliance process, while providing small volume manufacturers the flexibility needed to remain competitive. As a minimum requirement, ECO commented that at least one engine per family, per year, be tested to demonstrate ongoing compliance of production engines. As a second alternative, ECO suggested that EPA allow small volume engine manufacturers to utilize the use of alternative testing methods (portable emissions analyzers) to demonstrate in-use field testing compliance for production units.

Letters:

Commenter	Document #
ECO	0712

Our Response:

As part of the process of developing provisions for small businesses during the proposal, EPA identified 10 small businesses that are also small SI engine manufacturers. Based on estimated sales from the certification records, there companies represent less than 0.5% of small engine sales. The cost of performing testing for a PLT program are significant, especially for small companies that typically do not have their own emissions facility and must test at an independent lab. Even if we were to allow use of a portable system, the cost of such systems are still fairly expensive for the limited testing they would be used for. Due to the cost of running a PLT program and limited emission impact such a program could potentially have, we continue to believe that small volume engine manufacturers should be exempt from PLT testing.

2.12 Other issues

2.12.1 In-use testing

What Commenters Said:

NACAA noted that data available in the EPA docket indicates in-use compliance failures by various models of lawn and garden equipment. This has been a continuing concern of NACAA and is heightened by the fact that EPA did not propose a mandatory in-use testing program for these engines. NACAA urged EPA to consider the addition of such an in-use testing program, consistent with the requirements for outboard and personal watercraft engines, to ensure in-use performance at the levels envisioned by the regulation.

The Pennsylvania DEP noted that EPA has not proposed an in-use testing program for small spark-ignition engines despite the fact that in other recent proposals, EPA has treated in-use compliance as an important part of EPA's program for ensuring performance throughout the useful life. The Pennsylvania DEP commented that EPA should consider an in-use compliance program.

The MARC AQ Forum commented that the rule should establish a testing program to ensure that small engine emissions controls do not fail prematurely.

NESCAUM commented that it is essential that the engines affected by this rulemaking meet the applicable standards for the entire useful life of the equipment into which they are installed. Consequently, they believe the proposed requirements for verifying durability of emissions controls are inadequate, principally because there are no requirements for in-use emissions testing. Consistent with the durability requirements pertaining to OB/PWC engines, NESCAUM urged EPA to incorporate similar requirements for manufacturers of small SI engines and equipment, including a robust in-use testing program.

The Wisconsin DNR commented that EPA should consider the addition of a mandatory testing program for various models of lawn and garden equipment, to ensure in-use performance at the levels envisioned by the regulation.

OPEI noted that handheld engines are very difficult to test. OPEI requested that EPA provide more detail in §1054.401 of the regulations. For example, OPEI asked whether EPA will use the same test method and fuel for an in-use test as for certification. In addition, they asked if EPA will use the same fixtures the manufacturer used. OPEI suggested that language be added stating that EPA would test at the manufacturer's facility or request such fixtures from the handheld engine manufacturer.

EMA commented on §1054.401 of the regulations. They believe this section should clarify that EPA will use the same test method and fuel as used for certification by the engine manufacturer. Accordingly, EMA commented that this section should be revised to read as follows: "We may perform in-use testing of any engine or equipment subject to the standards of this part using the test procedures and test fuels utilized by the manufacturer during the certification process."

Letters:

Commenter	Document #
NACAA	0651
Pennsylvania DEP	0676
MARC AQ Forum	0696
NESCAUM	0641
Wisconsin DNR	0663
OPEI	0675
EMA	0691

Our Response:

In response to the comments recommending an in-use test program for Small SI engines, EPA is not adopting such a program in the final rule. EPA did not propose an in-use test program as part of the proposal and therefore it is difficult for us to adopt such a requirement without a chance for people to comment on the specifics of an in-use testing program. Given the large numbers of engine designs currently certified, and the wide range of applications into which those engines are placed, designing a testing program to gauge the performance of in-use engines and equipment would not be an easy task. Plus, there could be significant costs associated for manufacturers in running such a program depending on how the program is designed. EPA believes an in-use program for Small SI engines is something that should be given full consideration as part of a future rulemaking.

While an in-use test program could be a useful tool to determine whether in-use engines/equipment are complying with the standards, it is not the only way. In addition to certification testing, EPA requires manufacturers to perform production line testing to demonstrate that engines coming off the production line are emitting at the expected levels. Furthermore, EPA has the authority to perform selective enforcement audit (SEA) testing where engines coming off the production line are tested with EPA in attendance for the testing. Finally, EPA recently initiated its own on-going confirmatory test program that is expected to test a wide range of small engines in the coming years (not necessarily including engines that have already been placed into service). While none of these programs on their own can ensure engines will meet the standard in use, each will help to encourage manufacturers to produce well-designed engines that continue to meet the emission standards throughout their lifetime.

In regard to the comments that EPA should provide more details on how it would perform its own in-use testing, EPA has made one change to §1054.401 of the regulations. The regulation notes that EPA will consult with the manufacturer as needed to be able to perform a valid emission test. To the extent that engines can't be tested without unique fixtures or other approved "special test procedures" (see §1065.10(c)(2)), we would generally duplicate the methods used by the manufacturer for certification testing. This could involve testing at the manufacturer's facility or at any test facility we designate. This intent to duplicate the manufacturers' procedures does not apply for approved "alternate test procedures" for in-use testing (see §1065.10(c)(7)). Alternate test procedures are approved by EPA because they are expected to result in emission levels similar to what would result from the standard test procedure. Therefore, although we may choose to do so, EPA sees no reason to commit to using an "alternate test procedure" for testing in-use engines.

With regard to test fuel used for in-use testing, EPA has made a change to the regulatory provisions. As described in Section 2.5.4, we are finalizing provisions that will allow manufacturers to use a 10 percent ethanol blend for certification testing for exhaust emissions from nonhandheld engines, as an alternative to the standard test fuel (Indolene). This option to use a 10 percent ethanol blend for certification of nonhandheld engines will begin with the implementation date of the Phase 3 exhaust standards and would apply to production-line testing as well. We are also committing to using a 10 percent ethanol blend for all confirmatory testing we perform for nonhandheld engines certified on the ethanol blend, under conditions specified in Section 2.5.4. Our commitment to test on an ethanol blend for those nonhandheld engines certified on an ethanol blend has been noted in §1054.501 of the regulations.

For handheld engines, we are not committing to using the same fuel as the manufacturer used for certification testing. EPA would expect to use Indolene for all in-use testing of handheld engines, although we could decide, at our own discretion, to do exhaust emissions testing using the certification fuel used by the manufacturer.

With regard to the fixtures used for testing handheld engines, EPA has not made any changes to the regulations. For any in-use testing, EPA would expect to contact manufacturers to ensure that we are testing engines in a manner that is appropriate for operating the equipment on an engine dynamometer. While this may include requesting a fixture from the engine manufacturer, EPA does not believe this will always be necessary and will not commit to doing so at this time.

2.12.2 Voluntary green labeling program

What Commenters Said:

NESCAUM commented that they support the concept of a "green labeling" program, as a means to make consumers aware of which engines exhibit especially clean emissions performance as consumers make their equipment choices. In the Phase 2 rulemakings for handheld and nonhandheld SI engines, EPA committed to "pursue the development of a voluntary green labeling program for small SI engines as a non-regulatory program." NESCAUM noted that more than eight years have now elapsed since EPA made this commitment and as yet, there is no such program. NESCAUM urged EPA, through this rulemaking, to renew its commitment to work with stakeholders to develop a green labeling program.

Letters:

Commenter	Document #
NESCAUM	0641

Our Response:

EPA is not prepared to commit to developing a voluntary green labeling program for the Phase 3 standards at this time. In several previous rulemakings, EPA has adopted provisions allowing manufacturers to certify to “Blue Sky” standards in the nonroad diesel, marine diesel, and large SI categories. These Blue Sky standards are more stringent than the regularly applicable standards and allow manufacturers to note such compliance on the engine label. While we have had such standards in place since 1998, no manufacturer has yet certified an engine under these standards. Therefore, while we could consider a voluntary labeling program, we are not convinced that manufacturers are interested in participating in such a program. While EPA could pursue a voluntary program in the future, we are not committing to developing a program for the Phase 3 standards in this rule.

2.12.3 Miscellaneous Issues

What Commenters Said:

EMA commented that §1054.15(b) “Do any other regulation parts apply to me?” states that Part 1065 describes procedures and equipment specification for testing engines. However, Part 1065 only provides this information regarding exhaust emission testing, not evaporative emission testing. Accordingly, EMA commented that this section should be revised to read as follows: “Part 1065 of this chapter describes procedures and equipment specifications for exhaust emission testing engines. Subpart F of this . . .”

EMA noted that §1054.101(b) states that HC and NOx exhaust emissions are optional for wintertime engines. However, §1054.101(d) states that two-stroke snowthrower engines may meet exhaust emissions standards that apply to handheld engines with the same engine displacement. In order to avoid any confusion between the requirements set forth in §1054.101(b) and (d), EMA commented that §1054.101(d) should be revised to read as follows: “Notwithstanding the provisions of subpart (b) of this part, two-stroke . . .”

EMA commented on §1054.205(a) “What must I include in my application?” EMA commented that it is not clear what information is required for engine families where the certification test engine has a maximum modal power in excess of 15 kW. Accordingly, this section should be revised to read as follows: “For each engine family in which the maximum modal power of the emission-data engine is at or above 15kW, provide the nominal brake power for engines included in the engine family as described in 40 CFR Part 1054.140.”

EMA commented on §1054.235(e) “What exhaust emission testing must I perform for my application for certification of conformity?” EMA noted that pursuant to this section, EPA may require a second engine to be tested. However, the section fails to define how the “official” results of such testing will be determined. EMA recommended that EPA’s current practice – which is to use the average of the results obtained – be included in the final rule.

G. Alcock commented that there is a very important overriding consideration regarding all leaf blowers. The particulates sent into the air in the process of 'blowing' far outweigh the combustion output as regards overall pollution. Leaf blowers should be banned entirely. Leaf vacuums are far more efficient and could even be restricted to electrical power sources. All homes have external electrical outlets. To limit the financial business loss of leaf blower manufacturers (which should not be the criteria by which laws are considered) would be the conversion of leaf blowers to vacuums. Innovation would allow designs for these modifications and a much cleaner environment would result. In Arizona's attempts at legislation, the ban was immediately thrown out because it would hurt the manufacturer of leaf blowers. This is the tail wagging the dog. They said use of leaf blowers would be limited to high pollution days. Every time a leaf blower is used the local area becomes a high pollution day.

Letters:

Commenter	Document #
EMA	0691
G. Alcock	0601

Our Response:

We agree that §1054.15(b) should be changed to focus on exhaust emissions. The regulations have been changed accordingly.

We agree that §1054.101(b) and (d) from the proposal need to be reconciled. We have combined these into a single paragraph and added the clarification that the handheld HC+NOx standards apply to the two-stroke snowthrower engines if they are certified to the handheld standards.

We believe the proposed requirement to identify maximum engine power for engines with maximum modal power over 15 kW is exceptionally clear. Maximum engine power is a defined term (see §1054.140), as noted by EMA's comments on that subject. Maximum engine power is the parameter used to determine whether engines are subject to the requirements of part 1054, so any other information would not be suitable for identifying the engine family in §1054.205(a). Note that we are revising the regulation to require reporting of maximum engine power for engines with displacement at or below 1000 cc only if maximum modal power is at or above 25 kW.

We disagree with EMA's suggestion that we should specify in §1054.235(e) that the results from a second engine tested by the manufacturer should be averaged with the results from the first engine to determine the official result for the engine family. The regulations at §1054.240(a) specifically state that all engines tested for certification need to comply with emission standards. Allowing the averaging approach would allow manufacturers to have a test engine with emissions above the standard that is offset by an engine from the same family that has lower emissions. This is clearly incompatible with the principle that the test engine needs to represent the worst-case configuration and that every engine produced under the engine family must meet emission standards. This is consistent with the current regulations at §90.104(a), which also require that all test engines meet applicable standards.

We understand that there are certain quality-of-life concerns regarding the use of Small SI engines. We encourage the responsible use of leaf blowers and other types of equipment that may be operated in neighborhoods or in other areas where people may be sensitive to the use of such equipment. However, the Clean Air Act directs us to set emission standards for these products without giving us the authority to limit the use or sale of these products.

3 Exhaust Emission Standards and Related Requirements for Marine SI Engines

What We Proposed:

The comments in this section generally correspond to Sections III, IV, and VII of the preamble to the proposed rule, where we describe the proposed emission standards and certification procedures associated with exhaust emissions from Marine SI engines. The applicable regulatory provisions for these proposed requirements are in 40 CFR part 1045. The Regulatory Impact Analysis describes the feasibility of these standards, special provisions that apply to small businesses, and alternative standards under consideration in Chapters 4, 10, and 11, respectively. There are also several technical amendments to the regulatory provisions in 40 CFR part 91.

See Chapter 1 of this document for a discussion of issues that apply more broadly than only for Marine SI engines. See Chapter 4 of this document for a discussion if issues related to evaporative emissions.

3.1 Scope and applicability

3.1.1 Differentiating Small SI and Marine SI engines

See Section 3.12.3 for a discussion of issues related to installation of certified Small SI engines in marine vessels.

3.1.2 OB/PWC and SD/I definitions

What Commenters Said:

NMMA and Brunswick commented that they have no objections to creating a single term that would include both sterndrive and inboard engines in a single category of engines and that also clarifies that hovercraft and air boats are specifically included in this engine category.

BRP and Yamaha commented that they use PWC engines to propel their jet boat products (also called “sport boats”), which would be classified as sterndrive/inboard under the new regulations. BRP commented that both EPA and CARB currently categorize Sport Boats with outboards and personal watercraft. Currently, BRP certifies its Sport Boat models in the same engine families as PWC models for both EPA and CARB. BRP and Yamaha commented that including jet boat engines in the SD/I category creates a new more stringent set of emission standards for these engines. Both manufacturers commented that this is only appropriate if jet boats are given sufficient lead time to comply with the standards and the corporate average provision is expanded to allow CO averaging.

Letters:

Commenter	Document #
NMMA	0688
Bombardier	0674
Yamaha	0721
Mercury	0693

Our Response:

We are finalizing the definition of sterndrive/inboard engines as proposed. We believe classifying engines used in hovercraft, air boats, and jet boats as SD/I engines is appropriate because it will subject the engines in these applications to the same emission standards as other boats with similar size, power, and usage characteristics. As described in Section 3.2.3, we are providing flexibility in meeting the new emission standards for jet boat engines because they are currently designed to use engines derived from OB/PWC applications and because of their relatively low sales volumes. We believe that this flexibility, coupled with the additional lead time, addresses the comments raised by BRP and Yamaha regarding lead time and CO averaging.

3.1.3 Maximum engine power and displacement

What Commenters Said:

NMMA and Mercury Marine commented on § 1045.140 at which EPA defines “maximum engine power” as the “maximum brakepower point on the nominal power curve for the engine configuration.” 72 Fed. Reg. at 28,268. Section § 1045.140(b) states that “[t]he nominal power curve of an engine configuration is the relationship between maximum available engine brake power and engine speed for an engine, using the mapping procedures of 40 CFR part 1065, based on the manufacturer’s design and production specifications for the engine.” Id. The reference to the mapping procedures in Part 1065 is inappropriate. Under EPA’s current regulations for OB and PWC engines, manufacturers use SAE J1228 to determine maximum power, and the California regulations also require the use of SAE J1228. For the EU, manufacturers use ISO 8665, which is equivalent to the SAE standard. EPA’s proposal to require the procedures in Part 1065 would be inconsistent with these existing requirements and, importantly, would require significant additional testing over and above what is required for compliance with the California and EU requirements. This considerable cost burden on manufacturers is unjustified given there is no environmental benefit. NMMA recommends that EPA replace the reference to Part 1065 with SAE J1228 and ISO 8665. This would ensure consistency among the different regulatory schemes and reduce unnecessary compliance costs.

Indmar has concern over the procedure for establishing the nominal power curve and the resulting rated speed and rated power. California and the European Union use SAE J1228 or ISO 8665 (same except for English vs. metric). Section 1045.140(b) references 40 CFR part 1065 and should reference SAE J1228. They think EPA should remain common with CARB and eliminate the possibility of duplicate testing for EPA at a slightly different power level.

Bombardier commented that in 40 CFR 1045.140, EPA is proposing to redefine how maximum engine power is determined on marine spark-ignited engines by changing the current engine mapping procedures from SAE J1228 to 40 CFR 1065. Currently, the marine industry follows the procedures of SAE J1228 for EPA and CARB and ISO 8665 (functionally equivalent to SAE J1228) for the European Union (EU). By changing the mapping procedures for marine spark-ignited engines, EPA is forcing manufacturers to run a different test procedure for EPA than done for CARB and the European Union. This would impose a significant additional test burden on a manufacturer. BRP recommends EPA replace the reference to 40 CFR part 1065 with SAE J1228 and ISO 8665 to maintain harmonization with CARB and the EU.

Yamaha commented that EPA has elected to establish a test protocol that is without merit and will add increased cost to certification, possible additional costs for dyno replacements/updates and will not harmonize with what currently both the CARB and EU utilize which is SAE 1228 or the ISO equivalent for this purpose. Yamaha requests that EPA adopt the NMMA language of continued use of SAE J1228 for this purpose to harmonize on an International basis.

Letters:

Commenter	Document #
NMMA	0688
Indmar	0667
Bombardier	0674
Yamaha	0721
Mercury	0693

Our Response:

The regulations rely on the value for maximum engine power to establish which standards apply and to calculate emission credits. For example, the regulations include emission standards that differ for power ratings at 4.3, 30, 40, 250, 373, and 485 kW. It is important to have an objective method for establishing an engine's power rating for determining which standards apply and for calculating emission credits. The current regulations and the published SAE and ISO procedures direct the manufacturer to declare a value for rated power without any clear direction to establish that value based on an engine's power map or other operating characteristics.

It is true that manufacturers would need to run an engine map for each engine, but we expect that this is already common practice to establish the engine's power characteristics and determine the recommended prop range. Therefore, we disagree that the definition of maximum engine power in 40CFR 1045.140 will increase testing costs.

Note that maximum engine power is not related to testing engines. The relevant parameter for testing is maximum test speed. Manufacturers raised similar concerns about our approach for establishing maximum test speed, which we describe in Section 3.9.1.

3.1.4 Fuel additives for reducing emissions

What Commenters Said:

Pure Power commented regarding their EcoFuelTM Mach 3 Gasoline & Diesel Additive. They claim that independent test results reported by ATDS, Inc, Ontario, CA, (recognized by the EPA and CARB for automotive emission and fuel consumption) from both gasoline and diesel powered cars and trucks showed "across the board" reductions as high as: NOx (44%), HC (16.3%), CO (4.5%), opacity smoke (30.4%), particulates (18.3%), in addition to a 14% reduction in fuel consumption.

Pure Power also commented that their ThrustorTM & Schultz NozzleTM Marine Propulsion System reduces fuel consumption, while increasing overall vessel performance. The ThrustorTM is designed to mount on the anti-cavitation plate and skeg for all outboard and stern drive boats. The Schultz NozzleTM mounts to the vessel hull. Conservative projected fuel savings between 10% and 20% depending on vessels size and speed.

Letters:

Commenter	Document #
Pure Power	0664

Our Response:

Our regulations are intended to be fuel neutral and would not preclude the use of these fuels or additives. However, anyone wishing to obtain a certificate of conformity that relies on the use of a fuel that is not widely available or that relies on any particular additive would be required to demonstrate that the engines would consistently operate with such fuels or additives during in-use operation. Moreover 40 CFR 1068.101(b)(1) prohibits using the incorrect fuel if it renders the emission control inoperative.

3.1.5 Natural gas and LPG engines

What Commenters Said:

Rolls Royce submitted comment asking what legislation EPA will apply to our [natural] gas engines if they are to be used in marine application. Has EPA had a chance to check this?

Nautigaz shared commercial information related to their system for converting gasoline-fueled marine engines for operation on LPG. They pointed out the energy-security advantages of LPG based on the extensive domestic production of LPG fuels within the United States. They also maintained that engines operating on LPG will always be less polluting than diesel-fueled or gasoline-fueled engines. Nautigaz also pointed out various technical parameters of interest in designing marine systems, such as corrosion control, the advantages of fuel-level indicators and anti-deflagration devices.

Letters:

Commenter	Document #
Rolls Royce	0715
Nautigaz	0727

Our Response:

Oceangoing vessels that transport natural gas as a commodity product are increasingly using the stored (and vented) natural gas to fuel the ship's propulsion engines. The comment from Rolls Royce helped us realize that these engines would likely be subject to our Marine SI standards under the wording of the proposed regulations. These engines might be 20,000 or 30,000 kW, so the certification and testing protocol we have developed for Marine SI technologies would clearly not apply for these larger engines. To address this, we have revised the regulations to specify that natural gas engines above 250 kW would need to meet the standards that apply for marine compression-ignition engines. All automotive-type engines using natural gas today are less than 250 kW so this threshold should properly differentiate engines installed in conventional sterndrive and inboard vessels from the diesel-derived natural gas engines used in workboats and other commercial vessels. This is consistent with the recently adopted provision of 40 CFR 1042.1(e).

The emission standards in this rule are fuel neutral. Manufacturers may certify engines using LPG, gasoline, or other fuels. It may be possible for LPG-fueled engines to reach lower emission levels than gasoline-fueled engines, but our observation across the various engine categories is that catalyst-equipped engines have comparable emission levels whether they are fueled by gasoline, LPG, or natural gas. Diesel-fueled engines are subject to a totally different set of emission standards and other regulatory requirements.

3.2 SD/I standards and lead time

3.2.1 SD/I standards–level

What Commenters Said:

NMMA, Mercury Marine, Indmar, MECA, NACAA, Pennsylvania DEP, New York DEC, NESCAUM, and Environmental Defense support the HC+NOx standards of 5.0 g/kWh and CO limit of 75 g/kWh proposed by EPA for the SD/I engines.

NMMA stated that EPA is proposing a 5 g/kW-hr standard for HC+NOx and a 75 g/kW-hr standard for CO for SD/I engines starting in model year 2009. 72 Fed. Reg. at 28,263 (proposed § 1045.105). While NMMA fully supports the level of the proposed emission limits for HC+NOx and CO in § 1045.105(a), the 2009 model year implementation date is not feasible for the recreational marine industry.

Mercury fully supports the exhaust standards for SD/I Engines provided that the implementation dates are adjusted to provide necessary lead time.

Sea Ray wants to take this opportunity to express its concerns about the robustness of catalyst systems in the salt water environment. Since testing was never completed, CA will serve as a validation and feedback opportunity to all of us. The industry needs the additional time to understand what the problems might be should they arise.

Indmar commented that they were also actively involved in the test program to prove the technical feasibility of catalytic converters on SD/I engines for their useful life (480 hours) in both fresh and salt water. They supplied two boats as well as technical support to Southwest Research Institute to conduct the test program. They support the proposed federal emission regulations for new marine spark-ignited sterndrive/inboard engines that will substantially reduce emissions from these engines.

NMMA submitted comments regarding the Southwest Research Institute (SwRI) Saltwater Test Program. Even though the SwRI tests never proved catalyst feasibility in salt water, their members believe that, at this stage of catalyst development, there is little or no additional data to be obtained by completing the tests. The designs being tested at SwRI are not designs that any of the engine companies are considering pursuing. Whether or not they could survive 480 hours is of no value. Their members have their own compliance plans that include designs that appear to withstand saltwater operation, although they will not know for sure until it gets into the hands of customers. Therefore, NMMA agreed that EPA and CARB should discontinue the SwRI saltwater test program.

NMMA continued that in the context of EPA's recently proposed rules for exhaust controls for marine engines, there is a continuing concern regarding catalyst and sensor durability, especially in salt water, and in engine technologies not included in the SwRI test programs, for example, personal watercraft engines installed in jetboats. The manufacturers of those items also have been unable to provide any help to the engine manufacturers in this regard as they have no experience in the salt water environment. NMMA stated that it is critical to both the marine industry and the hundreds of thousands of American jobs that are created by this industry, that EPA delay implementation of any nationwide catalyst-based rule until the manufacturers have studied the effect of the catalyst through a complete warranty cycle (three years) and the manufacturers gain the necessary field experience in California. In any waiver decision regarding catalysts for SD/I, they commented that EPA must make clear that it is not predetermining the outcome of the ongoing rulemaking, and that if durability problems should arise in actual use in California, that EPA will work with CARB and engine manufacturers to adjust any rules applicable to these engines.

NACAA commented that with respect to marine spark-ignition engines and vessels, NACAA supports EPA's proposal to set CO standards for all sectors. We also support the agency's proposal to establish the first-ever federal standards for vessels powered by sterndrive or inboard engines.

Pennsylvania DEP supports EPA's proposed standards and implementation schedule for marine spark-ignition engines and vessels.

New York DEC stated that EPA proposes to adopt standards similar to California's, resulting in a 70% reduction in combined hydrocarbon and oxides of nitrogen (NOx) emissions. The Department supports the proposed emission standards, including not-to-exceed (NTE) standards and the requirement for closed crankcases.

NESCAUM supports EPA's effort to harmonize the federal emissions standards with those standards already adopted in California. In many respects, the proposed federal standards are identical to or analogous with California standards. This approach will make it easier for the engine and equipment manufacturers to provide 50-state products to the U.S. market.

Environmental Defense supports EPA's proposal to establish HC+NOx exhaust emission standard of 5g/kW-hr for sterndrive and inboard marine engines (SD/I engines). These standards are identical to those adopted by CARB. The proposed exhaust emissions standards represent significant reductions of 70% in HC and NOx and 50% in CO emissions. EPA predicts engine manufacturers will meet these standards by incorporating catalysts into the water-cooled exhaust systems used for these engines. Environmental Defense applauds the Agency for taking the initiative to set a carbon monoxide exhaust emission standard for SD/I engines for the first time. The addition of a CO standard should not impose any additional costs on engine manufactures since the same catalyst technology used to achieve the HC and NOx standards will ensure that the new CO standard is met as well.

MECA stated that the technology to reduce emissions from spark-ignited inboard and sterndrive marine engines will be based on automotive-type three-way catalyst with closed-loop control technology. This technology has been used on well over 300,000,000 automobiles with outstanding results and the same technologies can be adapted to marine inboard and sterndrive engines. Here again results from EPA and ARB sponsored test programs detailed in the EPA Draft Regulatory Impact Analysis confirm that three-way catalysts (TWCs) can be effectively integrated into marine inboard and sterndrive engines, and TWCs have the necessary mechanical integrity and catalytic durability to perform with high emission conversion efficiencies throughout the entire 480-hour useful life emissions requirement for these marine engines, regardless of operation in fresh or salt water environments. Important results from this demonstration program included the design and integration of exhaust manifolds with TWCs that provided relatively low exhaust manifold surface temperatures (through the use of a water-jacketed exhaust system) and minimized the potential for water ingestion into the region of the manifolds that contained the TWCs. Both ceramic- and metallic-based substrates were used to display a range of three-way catalyst formulations as a part of this durability test program, all with good results. Thus, a variety of TWC technology options used successfully in automotive applications were shown to be effective in these marine engine applications. The early commercial introduction of a catalyst-equipped marine inboard engine is further proof that catalyst can be used to achieve EPA's proposed HC+NOx and CO standards for this category of Marine SI engines.

SCAQMD staff believes that more stringent standards for this category are also appropriate, technically feasible, and absolutely critical for the South Coast Air Basin to meet its PM 2.5 and 8 hour ozone standards. Engines in this category are closely related to automobile engines which have achieved much lower emission levels using advanced emission control systems for more than 20 years. Successful transfer of this technology to land based nonroad engines (which are also similar to automobile engines) has lead the California Air Resources Board and the U.S. EPA to adopt exhaust standards that will require new engines to meet exhaust levels two times, and by 2010, five times more stringent than those levels proposed in this rule.

See 3.2.3 for comments specifically related to jet boat engines. See 3.4 for comments specifically related to high-performance engines.

Letters:

Commenter	Document #
Sea Ray	0683
South Coast AQMD	0704
NY DEC	0659
NESCAUM	0641
Environmental Defense	0648
NACAA	0651
Indmar	0667
Mercury	0721
MECA	0668
Pennsylvania DEP	0676

Our Response:

As supported by the majority of commenters, we are adopting the proposed exhaust emissions standards for SD/I engines of 5 g/kWh HC+NOx and 75 g/kWh CO. The final HC+NOx standards are similar to the California ARB emissions standards for HC+NOx that began in 2008. We believe the type of catalyst used to achieve the HC+NOx standard will also be effective in reducing CO emissions enough to meet the new standard, therefore no additional technology will be needed to control CO emissions.

We believe the final federal exhaust emission standards for SD/I engines represent the greatest degree of emission reduction feasible in this time frame. Over the past few years, developmental programs have demonstrated the capabilities of achieving significant reductions in exhaust emissions from SD/I engines. Chapter 4 of the Final RIA presents data from several of the SD/I engines with catalysts that were tested as part of the development of the standards had HC+NOx emission rates lower that 5 g/kW-hr, even with consideration of expected in-use emissions deterioration associated with catalyst aging. The goal of the testing was to demonstrate catalysts that will work within the packaging constraints associated with water jacketing the exhaust and fitting the engines into engine compartments on boats. California ARB has acted on this information to set an HC+NOx emission standard of 5 g/kW-hr for SD/I engines, starting in 2008. At this time, three engine manufacturers have certified SD/I engines to these standards. In addition, Chapter 4 of the Final RIA presents data from these engines as detailed data on several developmental SD/I engines with catalysts packaged within water-cooled exhaust manifolds. Four of the developmental engines in our test program were operated with catalysts in vessels for 480 hours. The remaining developmental engines were tested with catalysts that had been subjected to a rapid-aging cycle in the laboratory. As stated in their comments, Indmar has demonstrated the durability of catalysts over their full useful life of SD/I engines, both in fresh and salt water. Data from these catalyst-equipped engines also support the level of the standards. We also performed testing on SD/I engines equipped with both catalysts and EGR. Although this testing showed emission results in the 2-3 g/kW-hr range, we expect that similar reductions could be achieved more simply through the use of larger catalysts or catalysts with higher precious metal loading.

Past experience, in other engine categories, indicates that most manufacturers will strive to achieve emission reductions well below the final standards to give them certainty that they will pass the standards in-use, especially as catalysts on SD/I engines are a new technology. Therefore, we believe the emission standards for SD/I engines represent the greatest degree of emission reductions achievable taking into consideration the potential variability in in-use performance and in test data mean and do not believe it would be appropriate at this time to set a lower standard for these engines.

3.2.2 SD/I standards–lead time

What Commenters Said:

NMMA and Mercury Marine stated that while SD/I engine manufacturers have started the necessary research and development to produce engines and emission control systems to comply with the 2008 CARB standards, the California market represents only a small portion of the national marine engine market. As a result, they argued that some manufacturers will limit the engine models offered in California because there is not sufficient lead time to reconfigure their entire product line. They commented that the implementation date for the federal emissions standards must take into account the challenge of designing catalyst-based systems for all engines across the entire SD/I engine market. Mercury Marine adds that due to the issue of a major change in base engines supplied by GM (see below) a 2009 implementation date would force Mercury to apply for hardship relief as soon as the rule is finalized. This is not the way they would like to start off a new rule.

NMMA and Mercury Marine stated that EPA is proposing a 5 g/kW-hr standard for HC+NOx and a 75 g/kW- hr standard for CO for SD/I engines starting in model year 2009. 72 Fed. Reg. at 28,263 (proposed § 1045.105). While NMMA fully supports the level of the proposed emission limits for HC+NOx and CO in § 1045.105(a), the 2009 model year implementation date is not feasible for the recreational marine industry. NMMA has worked cooperatively with EPA over the past several years to share data and information on the status of the development of catalyst technology that can be used effectively and safely in both fresh and saltwater environments. While the technology is commercially available, the ability of manufacturers to develop catalysts and reconfigure all of their engines to accommodate catalyst-equipped exhaust systems by model year 2009 is not realistic for several important reasons that are specific to how the marine engine industry is structured.

NMMA urges EPA to adopt in the final rule the third option for implementation discussed—full compliance with the emission limits in model year 2010 for all SD/I engines except for the replacement engines for the 4.3L and the 8.1L and personal watercraft engines installed in jet boats, which should have until model year 2011 to comply. Mercury Marine is limiting model availability in CA for 2008 – 2009 and needs until 2010 to have all of the horsepower levels covered for a National Rule. Mercury Marine has supplied a confidential list to EPA of the engines and power ratings that will not be available as catalyst engines for 2008 – 2009 and will not be sold in California.

NMMA and Mercury Marine commented as EPA notes in the preamble, a large number of SD/I engines are based on automotive engine blocks produced by General Motors (GM). 72 Fed. Reg. at 28,115. EPA also correctly points out that GM plans to discontinue production of the 4.3L and 8.1L engine blocks in 2009 and instead plans to offer a 4.1L engine block and a 6.0L supercharged engine as replacements. There are significant market and compliance implications associated with GM's product plans, which the NMMA-suggested compliance schedule would address. From a cost perspective (which EPA correctly identifies in the preamble), the small number of remaining years of sales of the 4.3L and 8.1L fail to justify the considerable costs associated with developing catalyst-based exhaust systems for these engines. From a compliance timing perspective, manufacturers that marinize the replacement engines will only be able to start designing catalyst systems sometime late this year when it is expected that manufacturers will see the first prototypes of the replacement engines. The development cycle for marinizing the base engine is over two years for some companies. Thus, a model year 2009 implementation date does not allow enough lead time for the industry to marinize the replacement engines and develop exhaust control systems.

Mercury Marine added that CARB has already provided relief on these engines for 2008 and 2009. The development cycle for marinizing the base engine is three years. Production base engines from GM are not scheduled to be available until 2010, and that assumes they maintain their current schedule. They commented that they have already been advised that the GM timeline has slipped a few months. Furthermore, having to develop these new engines as catalyst marine engines is taking resources away from being able to develop catalyst versions of the engines listed above that will not be available in California. Mercury Marine commented that the workload is more than can be accomplished to launch all of these new and modified engines on a national level before 2010 – 2011.

NMMA also commented that the other option for implementation that EPA suggests is to allow an additional year for the engines not using catalysts in California in 2008, namely the 4.3L and the 8.1L. NMMA stated that the model year 2009 is not practical and that an additional year for these engines until model year 2010 is appropriate and justified. California's marine engine standards will require catalysts on engines (other than the two engines noted above) starting in model year 2008. In light of this short lead time and the number of different products offered, NMMA argued that marine engine manufacturers will not have the ability to fully catalyze their entire line of engines for California in that time frame. Also important to consider is that the California market constitutes only a small percentage of the marine engine market (unlike the case with motor vehicles, which is larger than the percent of the overall population). Thus, marine engine manufacturers will in some cases limit the engines available in California to those that can be readily catalyzed and will continue to sell a mix of catalyzed and noncatalyzed engines in the other 49 states in 2008 and 2009. NMMA stated that, by model year 2010, engine manufacturers should have the necessary lead time required by Clean Air Act § 213 to resolve most, if not all, of the technological challenges involved with catalyzing their entire product lines, with the exception of the replacement engines for the 4.3L and the 8.1L.

NMMA and Mercury Marine stated that the phase-in approach suggested by EPA in the preamble is not a workable option for this industry. With thousands of boat builders dispersed across the U.S., marine engine manufacturers do not have ultimate control of the type of engines purchased and installed on boats. This is particularly the case where the engine manufacturer is still manufacturing engines that are not catalyzed. Boat builders determine which engines are purchased and can choose either catalyzed or non-catalyzed versions of the engines since boat builders are not subject to emissions standards. For these reasons, they concluded that a compliance deadline in model year 2010 for the majority of SD/I engines, with full implementation in model year 2011, makes sense in the context of this particular industry.

NMMA summarized comments from its members of Four Winns Boats, LLC, Chaparral/Rodalo Boats, Massachusetts Marine Trade Association, Regal Marine Industry, Challenger Power Boats, Godfrey, Lowe Boats, Brunswick Corporation, North American Sleekcraft, S2Yachts, Sea Ray, Hallett, Cigarette Racing, Premier Marine Inc., and Larson/Glastron Boats. Two manufacturers urge EPA to adopt the third option for implementation: full compliance with the emission limits in 2010 for all the 4.3L & 8.1L and their replacements will have until 2011. Three manufacturers state engine supplier (Mercury Marine/GM) needs until 2010 to have all hp levels covered for national rule-if 2009, some models may be available for one year before phase-out. Four manufacturers commented the engines will need to be installed with onboard diagnostic emission notification systems - need time to engineer approach once receive engines from engine supplier. One commenter stated, as a small independent builder, the technology and the products to support this are clearly not available today and is pleading that the EPA will push this back until 2011 to allow for proper testing and implementation. Twelve commenters stated that California imposed requirement should be a testing ground until the system can be validated for a national release with a few years into the program. One commenter stated that the proposed implementation is not feasible due to changes being made in the availability of GM based engines which would result in some one year offering of motors and recommend gradual phase-in with full compliance by 2012.

VolvoPenta supports full industry compliance with standards in 2010, except for 4.1 and supercharged 6.0 which need until 2011. This option keeps a level playing field for all small business partners and allows more time for California catalyzed units to acquire hours of actual operation in consumer hands. The option will provide adequate time for Volvo Penta to develop full model lines demanded by customers and ensures compliance to the rule. Volvo Penta needs additional time to conclude its own saltwater testing and to monitor the durability of California compliant engines. Volvo Penta stated that, if U.S. EPA proceeds with a rule requiring full industry compliance on January 1, 2009, with the standards for SD/I engines, then their comments are intended to serve as Volvo Penta's application for a hardship exemption.

Sea Ray advocated EPA to adopt, in the final rule, the third option for implementation discussed—full compliance with the emissions limits in 2010 for all SD/I engines except for the 4.3L and 8.1L, and their replacements, which should have until 2011 to comply. Their engine supplier, Mercury Marine, is limiting model availability in CA for 2008 – 2009 and needs until

2010 to have all of the Hp levels covered for a National Rule. If the 2009 date is implemented, Sea Ray commented that some of these models may only be available for a single year before being phased out. Moreover, since these engines will need to be installed with on board diagnostic emission notification systems, they will need time to engineer their approach in coordination with the products they receive from Mercury. Sea Ray also expressed its concerns about the robustness of catalyst systems in the salt water environment. Because testing was never completed, California will serve as a validation and feedback opportunity to all of the industry. The industry needs the additional time to understand what the problems might be should they arise.

Mercury stated in a public hearing that if they had to meet the standard in 2009, as soon as the rule is signed, they would have to apply for relief under the hardship provision. Between the issues with GM that they have discussed, and the fact that they are not selling some models in CA, which they can not reconcile in their product line until 2010, Mercury stated that they need one of the options that is in the preamble. That option is compliance with the standard for the engine families that are not changing in 2010 and an extension to 2011 for the engine families being replaced by GM, keeping in mind that Mercury Marine will not get even prototype level hardware for GM's new engines until late this year or next year. According to Mercury, the development cycle for converting these auto base engines to marine engines is 30-36 months. This also allows for the possibility of GM missing the launch date of the new models and the industry not having to come back to EPA for hardship relief. Mercury will also gain some field experience with the catalyst engines in the California market, as catalyst feasibility testing at SwRI was terminated, with industry approval, without ever demonstrating catalyst durability in a saltwater environment. Because that independent testing, funded by EPA and CARB, was never completed, Mercury commented that it is reasonable to allow for the California market to be that testing grounds for 2 years. Lastly, when asked about phase-in programs, Mercury stated that one of the issues that they have is that they do not control the product mix in the field, instead the boat builder does. However, Mercury does like the provisions in the proposed rule for banking early credits which is an incentive to get catalysts into the market early.

California ARB strongly encourages U.S. EPA to adopt a 2008 start date of the 5 g/kW-hr HC+NOx standard for sterndrive/inboard engines to avoid putting California dealerships at a competitive disadvantage with out-of-State dealerships that would still be able to sell boats without catalyst-equipped engines at a significantly lower purchase price (less the cost of catalyst and associated hardware). Tooling will already exist for the catalyzed engines as a result of California's requirements, and an extra year to implement the same standards is unnecessary considering that the sole manufacturer already producing catalyst equipped engines for the California rule is doing so nationwide. Not only would nationally harmonized implementation eliminate the disparity in compliance costs between California and federal engines, it also makes sense from an economic perspective since the economies of scale (quantity discount) involved in producing a harmonized engine model nationwide rather than multiple state-based models would reduce the price of compliance both to the manufacturers and to the consumer. As EPA notes in the preamble, a sterndrive/inboard engine manufacturer that qualifies as a small business already offers a catalyst-equipped engine nationwide. Thus, the implementation delay and small volume manufacturer provisions proposed by U.S. EPA may be unnecessary, and would result in a delay in public health benefits. If U.S. EPA still believes it necessary to provide industry with some sort of compliance cushion, ARB suggested restructuring the federal program such that 2008 models could be treated leniently in-use initially, providing industry with a greater learning opportunity for fine tuning their catalyst system designs, rather than a delay in implementing the 5 g/kW-hr HC+NOx standard.

New Jersey DEP commented that several CARB standards for exhaust emissions are fully phased-in between 2005 and 2008, whereas the proposed phase-in dates for the corresponding federal standards do not begin until 2010. Of most concern, the special provisions for small and medium manufacturers may delay full compliance until 2014. In light of the fact that manufacturers will already be providing cleaner engines and equipment to California and that technology issues will not be a factor, New Jersey DEP stated that these cleaner engines and equipment should be required to be made available sooner nationwide.

MECA believes that the 2009 model year implementation date provides industry with adequate time to meet these standards.

NACAA noted that sterndrive and inboard engines with catalysts are already in production and engine manufacturers are already tooled to produce catalyzed engines for California for 2008. Therefore, although they believe the proposed federal implementation schedule – beginning in 2009 – is appropriate and should not be delayed, they recommend that EPA require that once a certified engine is available in California it be sold nationwide.

Pennsylvania DEP supports EPA's proposed standards and implementation schedule for marine spark-ignition engines and vessels.

NESCAUM supports EPA's current proposal, that the SD/I catalyst-based exhaust emissions standards take effect in 2009, one year following implementation in California. They agree with EPA's position that once the catalyst-based technology is introduced across product lines in California, it should be readily available nationwide soon thereafter. They see no need for EPA to implement the alternative approach of extending the compliance date to 2010. At the same time, as it appears that General Motors is discontinuing supplying the 4.3 and 8.1 liter engine blocks in 2009, they would not object to allowing additional time, as suggested, for the orderly transition to the 4.1 and 6.0 liter blocks. Their understanding is that the engines based on the 4.3 and 8.1 liter blocks represent a relatively small portion of the new marine engine market, compared to other more widely-used blocks. Presumably, the new 4.1 and 6.0 liter blocks will not claim a large share of the market, at least in their introductory years. Therefore, concluded commented that the overall emissions impact should be minimal if additional transition time is provided. They would support this approach (allowing additional time for engine blocks representing a small fraction of the market) over the alterative approach of allowing all engine families to certify to a more lenient transitional standard over the 2009-10 timeframe.

New York DEC urges EPA to require implementation of the standards in 2009 for all engines.

Wisconsin DNR commented that EPA shall require CARB certified sterndrive or inboard engines available in California from 2008 to be sold nationwide.

Environmental Defense commented that EPA has proposed an implementation date for the SD/I exhaust emission standards of model year 2009. California's HC and NOx standards take effect in model year 2008. Accordingly, the national standards will go into effect one year after the identical standards in CA. EPA observes that a "one year delay [in implementing the national rules] allows manufacturers adequate time to incorporate catalysts across their product lines as they are doing in California." Environmental Defense strongly opposes any delay beyond this proposal. Indeed, one engine manufacturer is already selling engines equipped with catalysts nationwide. Reducing the HC, NOx and CO emissions from these small recreational boats will assist many states and local governments in achieving or maintaining healthy levels of ozone, PM and CO and will help to ensure better air quality for many Americans.

Letters:

Commenter	Document #
NMMA	0688
Sea Ray	0683
NJ DEP	0710
Wisconsin DNR	0663
NESCAUM	0641
Environmental Defense	0648
NACAA	0651
Volvo Penta	0708
Mercury	0693
MECA	0668
NY DEC	0659
Pennsylvania DEP	0676
Mercury (hearing)	0642
Hallett	0713
Sea Ray	0683
S2Yachts	0697
North American Sleekcraft	0666
Brunswick Corporation	0695
Lowe Boats	0660
Godfrey	0645
Challenger Power Boats	0644
Regal Marine Industry	0635
Massachusetts Marine Trade Association	0634
Chaparral/Rodalo Boats	0630
Four Winns Boats, LLC	0650
Cigarette Racing	0637
Premier Marine Inc	0613
Larson/Glastron Boats	0626

Our Response:

Our SD/I standards start to take effect with the 2010 model year, two years after the same standards apply in California. We believe a requirement to extend the California standards nationwide after a two-year delay allows manufacturers adequate time to incorporate catalysts as they are doing in California across all of their product lines. Once the technology is developed for use in California, it will be available for use nationwide soon thereafter. In fact, one company currently certified to the California standards is already offering catalyst-equipped SD/I engines nationwide.

To address the challenge related to the transition away from the current 4.3 and 8.1 liter GM engines, we are adopting in the final rule a direct approval for a hardship exemption allowing manufacturers to produce these engines for one additional year without certifying them (see §1045.145). Starting in the 2011 model year, we would expect manufacturers to have worked things out such that they could certify their full product lineup to the applicable standards.

3.2.3 Issues related to jet boats

What Commenters Said:

NMMA commented that the proposed definition includes jet boats in the SD/I category. 72 Fed. Reg. 28,290. NMMA supports the inclusion of jet boats in the definition of SD/I engine with the condition that manufacturers of jet boats would receive until 2011 to comply with the more stringent SD/I emissions standards. Jet boats utilize the same engine technology as personal watercraft engines and have been regulated under the EPA standards applicable to personal watercraft and outboards. This technology is very different from SD/I engines, which rely on automotive-based engines. Additional lead time for compliance, therefore, is necessary to allow engine manufacturers sufficient time to redesign and develop engines—which typically takes three years for known technologies—that will comply with the new, more stringent SD/I emissions limits. It is inappropriate to subject jet boats to the same implementation lead-time as the SD/I engines considering that those manufacturers have been in product development for the 2008 implementation of the CARB standards over the last few years. It is also critical that, as proposed, jet boats be allowed to average credits, both HC+NOx and CO, generated by other personal watercraft and outboards to provide flexibility and ensure that jet boats will be able to meet the SD/I emission standards. NMMA is supportive of the proposed approach discussed in the preamble and in the proposed regulatory text in § 1045.701(d) provided CO averaging is included.

NMMA also stated that related to the inclusion of jet boats in the SD/I category is the treatment of the useful life for these engines. For PWC engines used in jet boats, NMMA supports a 5 year, 350 hour useful life. This is consistent with the proposed useful life for outboard and personal watercraft engines in the rule discussed below and is appropriate for jet boats given that the engines are identical. To force dual compliance levels for identical engines leads to confusion and increases the certification burden imposed on the engine manufacturer. NMMA also recommends that the useful life for jet boat engines be reviewed by EPA three years after the recommended model year 2011 compliance date and adjusted as experience is gained in the field with the unproven after treatment technology.

BRP stated in a hearing and submitted written comments that they cannot support EPA's proposed catalyst based emission standards for stern drive and inboard engines as it presently applies to water-jet sport boats. This product category has been regulated under the standards applied to outboard and personal watercraft engines on the basis that water-jet sport boats utilize the same engine technology as personal watercraft engines. It is understood that the EPA now desires to regulate this boat category, which has exclusively utilized automotive-based engines. These sterndrive and inboard engine manufacturers have effectively been developing a catalyst solution in preparation for the CARB regulation since approximately 2004. It is therefore very inappropriate to subject the water-jet sport boats to the same proposed lead-time given the difference in basic engine technology and prior catalyst development time.

Furthermore BRP commented there are numerous patents held by a competitive water-jet sport boat manufacturer which represent clear and significant design constraints to BRP in order to avoid patent infringement. There are effectively 30 related patents which have applicability to water-jet sport boats, 13 which have specific catalyst application constraints. These constraints include catalyst positioning, layout, cooling and sensor placement issues. The fundamental nature of these challenges results in the need for greater development lead-time.

BRP development and application lead-time for an established engine technology is approximately three years. The patent issues they have briefly explained represent complex design challenges and it is therefore not possible at this point to project the amount of additional development time required to meet the proposed catalyst application to water-jet sport boats.

BRP also stated that however, the lead-time challenge can be justly addressed by providing water-jet sport boat manufacturers which utilize an outboard personal watercraft engine technology the following allowances:

1. An implementation lead-time of model year 2011, and
2. BRP is supportive of the proposed corporate averaging provisions in 40 CFR 1045.701 (d) which allow "Sterndrive / Inboard engines certified under 1045.660 for jet boats may be use HC + NOx exhaust credits generated from outboard and personal watercraft engines, as long as the credit-using engine is the same model as an engine model from an outboard or personal watercraft family." For the corporate averaging provision of 40 CFR 1045.701 (d) to be meaningful to a manufacturer, CO averaging is essential for achieving compliance. **(also listed in 3.6.2)**

Yamaha stated in a hearing, after considerable discussions with their engineers to reach a feasibility consensus they request that if the EPA were to agree on a MY start date of 2011 (which again for Yamaha is April of 2010) for compliance at the Inboard level of 5 g/kW-hr, this would afford additional time to an already taxed staff, to design and build a "ground up engine" required to meet the target levels presented in the proposal. As the EPA may be aware, PWC engines utilized in Jet boats is a very small quantity, and short runs of catalyst based engines would be cost prohibitive. Therefore, this short additional lead time will have the positive effect of bringing into a lower compliance level, a greater amount of PWC engine families to help offset production costs. Again by allowing this lead time, the EPA will have championed even further emission reductions over the broad engine spectrum.

In Yamaha's view, a MY 2011 compliance date (although aggressive) was agreed upon internally as this appears to parallel what the EPA has considered acceptable lead time for the SD/l members affected by this rule as a result of new engine block design and feasibility issues. If the industry is in fact subject to classify PWC engines used in Jet Boats as a different engine then we need the additional lead time.

Yamaha submitted written comments stating the proposed definition includes Jet boats into the SD/I Category. Yamaha utilizes PWC engines (complete exact units) to propel their Jet boat product. The number of units used currently does not quite come to 8% of their entire PWC engine production, Yamaha will most likely by defacto have to produce en mass a compliant 5gr engine that will carry the day for both PWC and Jet Boat compliance. By allowing additional requested lead time this will in actuality further reduce emissions over a larger engine group. Even though this is an engine rule and should remain so, Yamaha will support this reclassification if the following flexibilities are granted or represented within the rule.

a. Enough lead time to develop, test and produce the necessary engine block, exhaust and catalyst systems required to achieve a 5gr level of HC+Nox emission and 75gr CO levels as proposed for SD/I engines. Yamaha estimates this to be achievable in M/Y 2011 which is reflective of the proposed lead time flexibility being requested by the SD/I engine suppliers due to the engineering challenges of a ground-up new engine block w/ catalyst being produce as a replacement to current available units.
b. Yamaha commented that language to exclude 75gr. CO requirement on PWC engines utilizing banked HC+NOx credits for Jet Boat reclassification compliance (between M/Y2009 and 2011) should be included in the rule as no banking of CO credits existed on previous Tier 1 requirements and currently are above the 75gr limit set for a catalyzed SD/I automotive based engine.

Yamaha requests that the useful life period for Jet Boat engines be the same as current PWC useful life of 5 years or 350 hours as these engines share same design and product use and, upon completion of a successful EPA technical review in 2014 raise the useful life period to that of SD/I. This would allow for proper long term durability testing of catalysts systems that would need to be in place. This request is not a large departure than the EPA seeking comment on the proposed reduced useful life structure of the High Performance SD/I engines. Yamaha strongly requests for PWC engines used in Jet Boats be granted similar flexibility and remain at the same useful life period as our PWC engines.

Mercury Marine stated that EPA is proposing to define "sterndrive/inboard engine" in § 1045.801 as "a spark ignition engine that is used to propel a vessel, but is not an outboard engine or a personal watercraft engine. This includes engines on propeller-driven vessels, jet boats, air boats, and hovercraft." 72 Fed. Reg. at 28,290 (emphasis added). Mercury Marine has no objections to creating a single term that would include both sterndrive and inboard engines in a single category of engines and that also clarifies that hovercraft and air boats are specifically included in this engine category. However, it is also critical that, as proposed, jet boats be allowed to utilize credits, both HC+NOx and CO, generated by outboards to provide flexibility and ensure that jet boats will be able to meet the SD/I standards. **(also listed in 3.6.2)** In addition, Mercury recommends that the new SD/I standards for jet boats become effective in 2011.

Yamaha asked whether the requirement to have smaller sales of jet boat engines than the analogous outboard or personal watercraft engines needed to be in place for every model year. The concern related to a scenario in which the outboard and personal watercraft versions of an engine would be discontinued while the jet boat engines would continue in production for another year.

Letters:

Commenter	Document #
NMMA	0688
Bombardier	0674
Yamaha	0721
Mercury	0693
Yamaha (hearing)	0642
Bombardier (hearing)	0642

Our Response:

We are providing some flexibility in meeting new emission standards for jet boat engines because they are currently designed to use engines derived from OB/PWC applications and because of their relatively low sales volumes. We will finalize the proposal to allow manufacturers to use emission credits generated from outboard and personal watercraft engines to demonstrate that their jet boat engines meet the new HC+NOx standards for SD/I engines. We are also adding the flexibility of CO emission averaging that was not previously included in the NPRM. This is necessary to fulfill the intent of the proposed flexibility.

Manufacturers of jet boat engines subject to SD/I standards and using credits from outboard or personal watercraft engines must certify these jet boat engines to an FEL that meets or exceeds the standards for outboard and personal watercraft engines. We are providing manufacturers a one year delay to meet the FEL requirement which now becomes effective in 2011.

Jet boat engines are now by definition sterndrive/inboard engines, so the default useful life period is 10 years or 480, whichever comes first. However, we understand that jet boat engines that are common to personal watercraft or outboard engine models depend on the preexisting certification demonstration. As such, we believe it is appropriate to allow for a 350-hour useful life so that the original certification can continue to be valid without additional durability demonstration for the jet boat engines. This shorter useful life does not apply for jet boat engines that are certified independently. Note that, under 1045(3)(2), any SD/I engine manufacturer may request that we approve a shorter useful life on a case-by-case basis.

We understand that there are valid business reasons to discontinue engine models in stages for certain applications. We believe the regulations should address Yamaha’s concern, especially because their plan involves a long-term strategy to design their jet boat engines to comply with the SD/I standards without relying on emission credits. We have revised this provision such that it no longer requires a demonstration of lesser sales of jet boat engines for every model year. This would allow us to respond to a special situation such as that described by Yamaha and acknowledge that their situation meets our intent. We would expect such a demonstration rarely to be based on sales information from more than two consecutive model years.

3.3 OB/PWC standards and lead time

3.3.1 OB/PWC standards–level and form of standard

What Commenters Said:

NMMA and Mercury Marine commented for outboard (OB) and personal watercraft (PWC) engines in § 1045.103, EPA is proposing a HC+NOx standard of 28 - 0.3 x P g/kW-hr for engines <= 40 kW. For engines > 40 kW, EPA is proposing 16 g/kW-hr for HC+NOx. 72 Fed. Reg. at 28,262. EPA explains in the preamble that the HC+NOx standards are similar in stringency to the 2008 model year California limits but use a “simplified form” as opposed to the one used by the CARB regulations. 72 Fed. Reg. at 28,130. While NMMA appreciates efforts to simplify a regulatory requirement, the best approach for emissions standards for the PWC and OB engine categories is to harmonize any new federal standards exactly with those in place in California. To establish a separate formula for developing the federal number, even if it is similar in stringency, creates additional complexity for the marine industry with no environmental benefit.

NMMA and Mercury Marine continued that with respect to CO emission limits, EPA is proposing in § 1045.103 for engines = 40 kW, a standard of 500 – 5.0 x P g/kW- hr, and for engines > 40 kW, a standard of 300 g/kW-hr. The proposal also would allow manufacturers to average, bank and trade emission credits and would require a family emission limit (FEL) for engines > 40 kW at a maximum of 450 g/kW-hr. The maximum value for the FEL for all other engines would be a formula of 650 – 5.0 x P. 72 Fed. Reg. at 28,263 (proposed § 1045.103(b)). These proposed CO levels are technologically achievable and assure that PWC and OB engines will be able to still meet the CARB 2008 HC+NOx emission standards. From a safety perspective, these levels are also appropriate. USCG boating safety statistics for deaths from CO poisoning clearly indicate that PWC and OB engines have no history of CO poisoning. A more stringent standard would impose a significant cost burden on these manufacturers with no health or welfare benefits as evidenced by the science and accident statistics associated with CO poisoning. Thus, NMMA supports these standards in the proposal and agrees that if EPA is to set a limit for CO, these levels are appropriate for these two engine segments.

Mercury Marine commented that EPA has requested comment on catalyst level emissions on OB/PWC. Mercury Marine is the only OB company that has to meet the CA SD/I catalyst level emissions standard for 2008. Since they have been developing catalyst systems for SD/I, Mercury states that they are in the best position to comment on this. For SD/I engines, where weight and packaging are much less of an issue, the cost to develop catalyst engines is in the vicinity of $3M per engine family. The engineering challenges to deal with water intrusion, condensation, exhaust gas temperatures, etc. have been enormous.

Mercury Marine continued that for Outboards, these challenges, and the associated costs, are more extreme. Due to the tight packaging, under cowl thermal management, and closer proximity to water, catalysts on outboards will be a larger, and more expensive, undertaking, and technical feasibility is not a given. It will entail a complete redesign of every outboard engine and, if technically feasible, will cost in the range of $8M – 15M per engine family, just in engineering costs, and take 4 – 5 years after a rule is finalized to launch the first models. Any such rule can not be finalized until technical feasibility is established. Therefore, it is inappropriate to consider catalyst level emissions on outboards at this time.

Honda commented on the Outboard and Personal Watercraft (PWC) Exhaust Standard Proposal. They suggest that EPA use the CARB's equation when setting the exhaust emission standard for outboard engines. Emission standards in the proposal's Section 1045.103 are described in the preamble as "simplified". Honda believes that they are not "simplified", but simply different with no real reason or environmental benefit. The proposed standard diverges from the original EPA standards curve and the California standard creating, not a simplified uniform standard for the United States, but rather two separate standards.

Bombardier commented that EPA explains these standards are of similar stringency to the CARB 2008 standards (3-Star), but are in a simplified form. However, creating a new standard different from the California standard complicates certification. BRP urges harmonizing the proposed HC +NOx exhaust emissions standards for PWC and Outboards with the CARB 3-Star emission standards.

Suzuki appreciates EPA's attempt to simplify the certification process wherever possible; however EPA's direction with the proposed HC+NOx standards creates a situation where some outboard engines currently certified to comply to CARB 2008 standards will require calibration and design changes to comply with the slightly different levels proposed by EPA while still maintaining reasonable compliance margins . This will be an expensive and resource-intensive effort which will not be of benefit to the environment. It is also important to note that the effort required to calculate the appropriate emission standard for a given engine family is not materially different between EPA's proposal and the CARB 2008 HC+NOx requirements. Considering that the rational for the proposed new Federal-specific HC+NOx standards is to simplify the certification process, and the actual effect will be to increase certification cost and effort, it is not reasonable for EPA to proceed with their proposed federal-specific HC+NOx standards. Suzuki requests EPA reconsideration of their proposal to create new Federal-specific HC+NOx emission standards, and requests EPA adopt a requirement that strictly harmonizes with the CARB 2008 HC+NOx standards.

Suzuki continued that EPA has proposed all-new CO standards of 500 - 5 .0 x P g/kW-hr for engines <40kW, and a standard of 300 g/kW-hr for engines of >40 kW. Additionally, EPA has proposed to limit maximum emissions of CO to levels of 150 g/kW above the applicable standard. Suzuki believes EPA's proposal represents levels that are technically achievable given reasonable lead-time and will allow for continued compliance with CARB 2008 HC+NOx standards without major design changes. However, EPA's proposed CO standards will require design changes and development for some Suzuki outboard engine families. Assuming that EPA harmonizes with the CARB 2008 HC+NOx standards and a reasonable amount of lead-time is provided, Suzuki can support EPA's new CO standards as currently proposed.

Tohatsu stated in a hearing that contents of the new regulations should be the same as the current CARB standards to avoid having to comply with two different sets of standards and testing methods. They would like to see one national standard rather than a national standard and then also other standards set by different local areas.

California ARB supports adoption of a federal 16 grams per kilowatt-hour (g/kW-hr) hydrocarbon plus oxides of nitrogen (HC+NOx) standard for outboard/personal watercraft engines greater than 40 kilowatt (kW). This standard is technologically feasible and is similar in stringency to the existing 2008 California standards for the majority of the category.

California ARB also supports U.S. EPA’s proposed carbon monoxide (CO) standards for outboard/personal watercraft and sterndrive/inboard engines. These standards are technologically feasible. ARB staff will likely propose the adoption of identical CO standards when it next revises California’s regulations for recreational marine engines.

NESCAUM supports EPA’s effort to harmonize the federal emissions standards with those standards already adopted in California. In many respects, the proposed federal standards are identical to or analogous with California standards. This approach will make it easier for the engine and equipment manufacturers to provide 50-state products to the U.S. market.

Environmental Defense supports EPA’s proposal to establish more stringent HC and NOx emission limits for outboard and personal watercraft (O/PW). The proposed standards, if implemented, would achieve more than a 60% reduction in HC and NOx emissions over existing standards. These standards are consistent with those previously adopted by CARB. Manufacturers will be able to achieve these emissions reductions by replacing older carbureted two-stoke engines with more advanced, direct injection two-stroke or four-stroke engines. This transition should be relatively easy and inexpensive for manufacturers as the market trend has been moving toward the retirement of carbureted two-stoke engines in favor of cleaner two and four-stroke engines. Environmental Defense is also pleased that EPA’s proposal includes a CO limit for OB/PWC engines. Achieving the proposed CO standard is readily achievable as the same two and four-stroke engines required to meet the HC and NOx standards will achieve the CO standard.

NY DEC stated that EPA proposes to adopt standards generally similar to existing California standards, yielding a 60% reduction in combined hydrocarbon and NOx emissions compared to current federal standards. The Department supports these proposed standards. NY DEC also stated that additional work is needed to facilitate the application of catalysts to outboard and personal watercraft engines, many of which are automotive sized.

NACAA commented with respect to personal watercraft and outboard engines, they support the proposed standards for implementation in 2009. They note that EPA anticipates manufacturers will meet these standards with readily available technology – improved fueling systems and other in-cylinder controls – and, therefore, question why the agency did not assess the feasibility of catalysts for these engines, for the purpose of pursuing future, more rigorous catalyst-based standards. They recommend that the agency conduct such an analysis and proceed with additional standards accordingly.

Pennsylvania DEP supports EPA's proposed standards and implementation schedule for marine spark-ignition engines and vessels. Since the standards proposed for personal watercraft and outboard engines appear to be easily achieved by manufacturers, DEP urges EPA to assess the feasibility of additional technology for the future as quickly as possible.

MARC AQ Forum stated that EPA should investigate the feasibility of using catalysts to reduce emissions from personal watercraft and outboard engines. If such technology proves workable, EPA should move expeditiously to set more stringent emissions standards for these engines.

SCAQMD staff believes that more stringent catalyst based standards are appropriate for this category. The California Air Resources Board staff in developing the outboard/personal watercraft standards in 1998 identified catalyst based technology as one of the possible technologies to meet the proposed standards. Their analysis showed that challenges in bringing catalyst technology to marine engines existed, but concluded that they were not insurmountable. Consistent with this conclusion, the California Air Resources Board proposed state strategy measure will require new outboard and personal watercraft engines to meet a 5.0 g/kW-hr by 2013 (approximately three (3) times lower than the U.S. EPA currently proposed standard). This level of control is expected to be reached using catalyst based technology. Review of the Draft Regulatory Impact Analysis document also shows that currently one personal watercraft manufacturer has certified engines equipped with an oxidation catalyst, demonstrating that catalyst based technology is feasible. Therefore, they believe that a more stringent catalyst based standard beginning in the 2013 timeframe is appropriate and they strongly urge EPA to consider adopting this additional standard (i.e., 3 to 5 g/kW-hr) for the outboard/ personal watercraft category as a second phase of catalyst based standards.

Wisconsin DNR requested EPA to assess the feasibility of more stringent catalyst-based emission standards for personal watercraft and outboard engines.

Letters:

Commenter	Document #
NMMA	0688
Honda	0705
South Coast AQMD	0704
Wisconsin DNR	0663
NY DEC	0659
Environmental Defense	0648
NACAA	0651
Bombardier	0674
Mercury	0693
MARC AQ Forum	0696
Suzuki	0698
CARB	0682
Pennsylvania DEP	0676
Tohatsu (hearing)	0642
Yellowfin	0681

Our Response:

Section 213(a)(3) of the Clean Air Act specifies the criteria EPA needs to consider in revising existing emission standards. Revised emission standards are to achieve the greatest degree of emission reduction technologically achievable taking into consideration the cost of technology in the lead time available to manufacturers, as well as noise, energy and safety factors. Given these criteria, EPA continues to believe that the proposed OB/PWC standards are the appropriate standards for these engines for the years in which they were proposed. These standards can be met through the expanded reliance on four-stroke engines and two-stroke direct-injection engines.

Based on industry input, we understand that our proposed simplification of the form of the HC+NOx standard would cause undue complexity for industry. Therefore, we will be finalizing a HC+NOx standard that utilizes a functional relationship to set the emission standard for each engine family depending on the power rating, common with the CARB 2008 emission standards. The final HC+NOx standard is roughly equivalent to the proposed standard, in terms of stringency, and will achieve more than a 60 percent reduction from the existing 2006 standards.

We will finalize the proposed CO emission standards for OB/PWC engines. These standards will result in meaningful CO reductions from many engines and prevent CO from increasing from engines that already use technologies with lower CO emissions. The new emission standards are largely based on certification data from cleaner-burning Marine SI engines, such as four-stroke engines and two-stroke direct-injection engines.

We believe the catalyst technology that will be required to meet emission standards substantially more stringent than we are adopting has not been adequately demonstrated for outboard or personal watercraft engines. Outboard engines are designed with lower units that are designed to be as thin as possible to improve the ability to turn the engine on the back of the boat and to reduce drag on the lowest part of the unit. This raises concerns about the placement and packaging of catalysts in the exhaust stream. As such, we believe the new standards for HC+NOx and CO emissions are the most stringent possible in this rulemaking. While there is good potential for eventual application of catalyst technology to outboard and personal watercraft engines, we believe the technology is not adequately demonstrated to determine whether or when such technology would be available. More time to gain experience with catalysts on sterndrive and inboard engines and a substantial engineering effort to apply that learning to outboard and personal watercraft engines may allow us to pursue more stringent standards in a future rulemaking.

3.3.2 OB/PWC standards–lead time

What Commenters Said:

NMMA and Mercury Marine commented that EPA's proposal has model year 2009 as the implementation date for the proposed HC+NOx and CO standards, including the FEL caps, for PWC and OB engines. 72 Fed. Reg. 28,262 (proposed § 1045.103). One calendar year lead time to comply with the federal emissions standards and the FEL caps is simply not workable for these engine segments because of the nationwide scope of the standards. Although these manufacturers will have some families that will meet the model year 2008 compliance date in California, a national rule (with fleet-averaging and FEL caps) in model year 2009 would disallow the sale of older, carbureted 2-stroke engines and would force these companies to re-engineer their entire product line. In turn, this would have a major impact on existing signed supply agreements with small boat builders which will lead to product shortages and disrupted business plans. The implementation of a national rule is a considerable undertaking that cannot be achieved in one year. Assuming that the rule is signed by the end of 2007, manufacturers will not see a rule published until early 2008. This means that some manufacturers could be starting production of model year 2009 PWC and OB engines at the same time a final rule is published. Even if a final rule is signed and published by the end of 2007, there is less than a one-year lead time for manufacturers. NMMA requests that EPA extend the implementation date for PWC and OB engines until model year 2010 and delay the imposition of FEL caps for PWCs until model year 2011. This results in the industry being able to meet the standards (with fleet averaging) in model year 2010, and gives industry an additional year to re-engineer the remaining PWC engine families that might be subject to FEL caps. Individual NMMA members will provide additional support in their separate comments as to why the additional delay of the FEL cap for PWCs is warranted.

NMMA and Mercury Marine continued to state that a two-year period for implementation is well supported by several EPA rules promulgated pursuant to its authority in CAA § 213. For example, for Recreational Vehicles, EPA provided a four year lead time and allowed for a phase-in. See Control of Emissions from Nonroad Large Spark-Ignition Engines, and Recreational Engines (Marine and Land-Based), Final Rule, 67 Fed. Reg. 68,242 (Nov. 8, 2002). In addition, for the first marine engine standards for PWC and OB engines, EPA provided industry with a two year lead time from the time of promulgation of the standards until the first implementation date for the emissions standards. See Control of Air Pollution; Final Rule for

New Gasoline Spark Ignition Marine Engines; Exemptions for New Nonroad Compression Ignition Engines at or Above 37 Kilowatts and New Nonroad Spark Ignition Engines at or Below 19 Kilowatts, Final Rule, 61 Fed. Reg. 52,087 (Oct. 4, 1996). As an alternative, EPA can draft the implementation date as two years from the date of publication in the Federal Register to ensure that a two-year lead time is preserved.

NMMA suggested that another approach that also would assist manufacturers in transitioning to a national standard is a phase-in of 50 percent in model year 2009 and the remaining 50 percent in model year 2010 and a delay of the FEL cap until model year 2011 for PWCs. Unlike the SD/I engine category, which is a very different market with unique distribution and sales arrangements, a phase- in approach for implementation is well-suited for the PWC/OB market. This would allow manufacturers to phase out carbureted 2 stroke engines and provide additional time for redesign and development of engines that can comply with the standards. EPA used a similar 50-50 percent phase-in for Phase I of the standards for Snowmobiles in the Recreational Vehicle Rule. See 40 C.F.R. §1051.103.

Mercury Marine also requests that EPA phase-in the OB standard between 2009 and 2010. Their recommendation is to allow 10% of the manufacturer's carryover product line to be excluded from the FEL caps in 2009. These units would still be required to utilize credits to meet the standard. They believe that there is no need for any exclusions, or modifications, in credit use or calculations. Starting in 2009, all Outboards would switch over to the new credit calculations in the new rule. Carryover credits from the current rule would still be useable for 3 years. Further, in order to not have to recertify most of the product line in just a few months, the final rule should allow carryover certifications, conducted under the requirements of the current rule, to be used until recertification of the product is required for other reasons.

Yellowfin commented that they are a low volume builder of high end offshore center console outboard boats. They commented that it is imperative for them to have ample supply of a variety of engines (2-stroke and 4-stroke). EPA's proposal that outboards meet the CARB 2008 standards nationally in 2009 would impact their business severely. They recommended that the CARB 2008 standards should be implemented nationally in 2010.

Honda requests that the effective date for compliance be extended to 2010 and not be 2009. They stated that EPA has proposed a 2009 implementation date for outboard exhaust emissions and outboard fuel lines. Honda will have certified and begun production of engines for the 2009 MY before this regulation is projected to be finalized. It will be quite difficult to certify and produce product with this negative lead time. However, they do believe that it will be possible to exhaust certify engines beginning in the 2010 model year.

Bombardier commented that provided EPA adopts the current 3-Star California exhaust emission standard for PWC and Outboards, BRP can fully comply with this standard in MY2009 if EPA allows carry-over data to be used.

Suzuki stated that although their full outboard engine product line is currently certified to the 2008 CARB HC+NOx standards, implementation of EPA's new proposed CO standards will require design changes to some Suzuki models to ensure that emissions of HC+NOx and CO are attained with sufficient compliance margin. Considering that production of 2008 models has already begun, EPA's proposed 2009 model year effective date will provide less than one year of lead-time which is insufficient for engine families that require changes from their 2008 model year configuration. As discussed above and assuming harmonization with CARB 2008 HC+NOx levels, compliance with the new CO standards proposed by EPA will require development effort for some Suzuki models. Therefore, Suzuki requests EPA adopt a 70%/100% phase-in of the new HC+NOx and CO standards for the 2009 and 2010 model years to allow for a reasonable development process.

Yamaha stated in a hearing that in the preamble, EPA has proposed to implement a start date of Outboard and PWC exhaust emission levels in MY 2009. To Yamaha, Model Year 2009 would mean compliance as of April, 2008 production which may come and go without signage of this very rule. Due to the protracted direction and ever dynamic time frames experienced with this NPRM, their Engineering and product planning staff are respectfully requesting that in order for Yamaha to re-evaluate their current model line-up, readjust the mapping and fuel calculation of current 4 stroke technology required to achieve a lower emission level across our product line and to be allowed to utilize our emission credits earned in 2006, 2007 and 2008 Tier I, an additional 1 model year lead time will be needed.

Yamaha continued to comment that this would be MY 2010 which for Yamaha would be production starting April of 2009. At this point all elements of the emission levels including the FEL cap within this proposal would go into effect. This in essence would disallow the sale of all carbureted 2 stroke engines from this point on, achieving one of EPA's objective goals.

Yamaha commented that the implementation dates outlined in the proposal reflect a Compliance Date of M/Y (model year) 2009. For Yamaha this would mean compliance for their line up of 25 engine families by April of 2008 production start period. That is if the rule is even signed on a time frame prior to this date. Yamaha recognizes the EPA is aware of compliant engines in California under the California ARB mandates but that quantity and models sold in CA is very small compared to a 50 state basis (10 families vs. 25 nationally). Yamaha has over 200 different model variations to supply the marine industry with appropriate designs and use characteristics for the boating public. It is their position that the M/Y 2009 is unreasonable and unobtainable for Yamaha based on many factors. Their current facility is working at and beyond peak output to supply a world market. To affect new mapping and fuel calibrations to any already taxed system will not be achievable in the proposed time period.

Yamaha continued to comment that another area affected by the proposed dates is long term supply contracts to many boat builders in the US that in their long term planning pre-existed EPA action and could not foresee a start date of this proposal. Due to its dynamic nature, to incorporate the necessary changes in boat design (flotation and transom strength) and sales structure is impossible for 2009. If Yamaha cannot continue to supply these engines currently being used by the builders a product shortage will occur causing business disruption to very small business owners and many parties face potential litigation for breech of contract.

Yamaha also stated that US protectorates and isolated attainment states (example Hawaii, Puerto Rico) fall under EPA reach but are supplied by our factory in Japan with product. These regions due to their remote locations have not embraced (both for technology infrastructure and cost reasons) new technology in regards to outboard product but, Yamaha USA must list these units in our product certification process and numbers.

Yamaha commented that as the EPA can realize, they have a monumental task ahead of them to achieve compliance even if allowed 3 years lead time. Yamaha also realizes that they can bring forward certain engines that can meet the new emissions levels as demonstrated by their compliance in CA. With this knowledge Yamaha is requesting that if the EPA cannot see the need to hold off starting exhaust emission compliance until M/Y 2010 then they propose a phase in amount of 50% of compliant engines (based on total engine sales) in 2009 with 50% exemption with no FEL or NTE caps and achieve 100% compliance in Model Year 2010 with all caps in place. This extra year is consistent with lead time flexibilities allowed in other EPA rulemakings.

NMMA member companies such as Ranger Boats, Triton, Premier Marine Inc., S2Yachts, Lund Boat Co, Brunswick Corporation, Brunswick Commercial and Government Products, Inc., Lowe Boats, Godfrey, Challenger Power Boats, Cigarette Racing, Massachusetts Marine Trade Association submitted comments to the proposed rule. Fourteen equipment manufacturers support 2010 (or later) for outboards due to the fact that outboard manufacturers were planning their new OB engine designs for 2010 and moving implementation to 2009 would result in some engine designs not being available for about one year. In order to remain competitive and assure a smooth transition, they need to have engine designs available. Some companies have international business and reputations that are needed to maintain for success. Some companies work on smaller margins and need all engine designs to be available. One manufacturer stated their desire for a gradual phase-in with full compliance by 2012.

Tohatsu stated in a hearing that it is quite a tough job for a small manufacturer like Tohatsu who has total employees of less than 500 people to re-develop and set calibration fuel, ignition timing, etc. and also comply with evaporation requirements. And naturally these changes will also require a new batch of deterioration testing at 350 hours for all models.

Sea Ray commented that in the rule, it is proposed that OB engines be compliant to the CARB 2008 emission standards by 2009. It is understood that OB manufacturers have been preparing for this changeover but with a 2010 target date in mind. Although it appears that most engines will comply by 2009, having this extra transitional year will be beneficial to all concerned. If the implementation date is accelerated to 2009, there may actually be some outboard model engines that will no longer be able to be sold in the United States. The industry currently faces enough issues regarding sales of boats in these use categories.

NACAA commented that with respect to personal watercraft and outboard engines, they support the proposed standards for implementation in 2009.

Pennsylvania DEP supports EPA's proposed standards and implementation schedule for marine spark-ignition engines and vessels.

CARB recommends that U.S. EPA revise the implementation date for this standard to begin in 2008 rather than in 2009 as proposed. Although slight, the potential exists for unfair competition between California dealerships and out-of-State outboard/personal watercraft dealerships that would be permitted to sell higher emitting, but less expensive, outboard/personal watercraft engines in 2008. ARB believes that sufficient flexibility already exists in federal regulations (e.g., 40 CFR 1068.240, 245, or 250) to address the compliance concerns mentioned in the preamble for manufacturers, if any, that do not sell outboard/personal watercraft engines in California and which because of this, may need more time to comply with the proposed standard.

NJ DEP commented that specifically, several CARB standards for exhaust emissions are fully phased-in between 2005 and 2008, whereas the proposed phase-in dates for the corresponding federal standards do not begin until 2010. Of most concern, the special provisions for small and medium manufacturers may delay full compliance until 2014. In light of the fact that manufacturers will already be providing cleaner engines and equipment to California and that technology issues will not be a factor, these cleaner engines and equipment should be required to be made available sooner nationwide.

Environmental Defense commented that EPA is proposing to implement the O/PW standards in model year 2009. California's comparable HC and NOx emissions standards take effect in model year 2008. While Environmental Defense agrees with EPA that it is feasible to implement these standards nationally one year after CARB's take effect, they see no reason why the standards cannot be implemented in 2008. As EPA notes in its explanation for this near-term implementation date, many manufacturers are already selling lower emission engines that meet the CARB HC and NOx standards nationwide. These manufacturers will not need to do anything in order to comply with the proposed federal O/PW standards. Therefore, they urge EPA to better explain its reason for the 2009, as opposed to 2008, implementation date.

Letters:

Commenter	Document #
NMMA	0688
Sea Ray	0683
Honda	0705
NJ DEP	0710
Environmental Defense	0648
NACAA	0651
Bombardier	0674
Yamaha	0721
Mercury	0693
Suzuki	0698
CARB	0682
Pennsylvania DEP	0676
Yamaha (hearing)	0642
Tohatsu	0642
Ranger Boats	0628
Triton	0656
Premier Marine Inc.,	0613
S2Yachts	0697
Lund Boat Co	0655
Brunswick Corporation	0695
Brunswick Commercial and Government Products, Inc.	0652
Lowe Boats	0660
Godfrey	0645
Challenger Power Boats	0644
Cigarette Racing	0637
Massachusetts Marine Trade Association	0634

Our Response:

We have considered the many comments we received supporting our proposed OB/PWC timing or arguing for different timing. Several air quality agencies and environmental organizations argued that earlier implementation of technologies is feasible. Many manufacturers commented that they will require an additional year to make their entire lineups compliant with the national rule.

We have considered the time required by the industry to complete the necessary design, development, and validation activities for their product lines, and have concluded that 2010 is the appropriate date for the new emission standards of OB/PWC engines. The option suggested by commenters for a 50/50% phase-in for 2009 and 2010 was not a feasible option because the rule will not be signed until after the 2009 model year begins. Essentially this phase-in would have allowed them to sell carbureted two-stroke engines for an additional year beyond the proposed implementation dates. The majority of the remaining engines can meet the new standard either directly, or through credit exchanges. By delaying the implementation date to 2010, manufacturers still have the additional year of lead time requested, beyond the proposed implementation date, to phase-out carbureted two-stroke engines. The final rule gives two years beyond the implementation date of the California standards of similar stringency. In addition to phasing-out carbureted two-stroke engines, manufacturers may need additional time to refine emissions calibrations for engines not currently sold in California. The additional time will give manufacturers time to address any models that may not meet the upcoming California standards or are not sold in California. This also accommodates the lead time concerns with the timing of this final rule as expressed by the commenters.

The new exhaust emission standards represent the greatest degree of emission control achievable in the effected time frame. While manufacturers can meet the standards with their full product line in 2010, requiring full compliance with a nationwide program earlier, such as in the same year that California introduces new emission standards, will pose an unreasonable requirement for manufacturers to develop entire product lines compliant with the new standards with little to no lead time. Allowing two years beyond California's requirements is necessary to allow manufacturers to certify their full product line to the new standards including the additional CO requirement, not only those products they will make available in California.

3.4 High-performance engines

3.4.1 Standards and relationship to ABT

What Commenters Said:

NMMA commented that for CO, EPA is proposing a 350 g/kW-hr standard for high-performance engines. NMMA supports this level and agrees that the technological challenges faced by high performance engines require a CO standard at that level. Individual NMMA members will provide further comments and test data supporting the CO level proposed by EPA in the rule. With regard to HC+NOx, EPA requests comments on the need for and level of alternative emissions standards for high-performance SD/I engines. While EPA proposes two possible alternatives, NMMA members believe that the most appropriate approach for the high-performance engine segment is a modification of the second suggested alternative, which is a 15-22 g/kW- hr standard for the high-performance segment, and to disallow credits. 72 Fed. Reg. at 28,117. NMMA recommends instead that EPA adopt a non-catalyst based standard with a cap set at 20 g/kW-hr for engines with rated output of 373 kW-484 kW in 2010 with a further reduction to 16 g/kW-hr in model year 2011. NMMA will also support a cap of 25 g/kW-hr for engines with rated output of 485 kW and above in model year 2010 with a further reduction to 22 g/kW-hr in model year 2018. These recommended levels are conditioned on the option of using the modified test cycle described below. Consistent with EPA's second alternative, NMMA also recommends that no averaging, banking or trading of credits be allowed for either HC+NOx or CO. Most high-performance engine manufacturers do not have products below the 373 kW rating with which to average. In addition, these manufacturers cannot rely on credits being available on the open market from their competitors. By removing the option for averaging, banking and trading, EPA will ensure a level playing field among all manufacturers of high-performance engines.

As EPA finalizes the standards for high-performance engines, NMMA encourages the Agency to work with CARB to ensure that the standards for high-performance engines are harmonized to the greatest extent possible. CARB staff included in the "ARB Staff Report: Initial Statement of Reasons for Rulemaking, September 30, 2005" that it was the staff's intention to return to the Board prior to the scheduled 2009 implementation date of the standards for "High Power Engines (greater than 373 kW)" and that they are awaiting the promulgation of the federal regulation. Thus, harmonization is clearly a priority for the CARB and NMMA urges EPA to work cooperatively with CARB to ensure consistency among the two regulatory schemes.

Ilmor supports fixed standards for all high-performance engine manufacturers. Two-tiered: 373-484 kW and >485 kW. Ilmor supports a rule with no ABT for high-performance sector. Ilmor supports harmonized standard for high-performance engines (>373 kw) for EPA and ARB. In a hearing, Ilmor commented that they estimate that 80% of the High-Performance engines are produced by 5 or possibly 6 manufacturers. (Mercury, llmor, Teague, Sterling, Flagship, Chief). An additional 10-20 very small businesses, produce as little as 15-25 engines per year each.

NMMA members (North American Sleekcraft, Inc., Brunswick Corporation) commented that catalytic converters not practical for low niche market. They produce boats that use engines over 500hp. EPA should put a cap on the current emission limitations for high performance for level playing field for those who make such boats. They believe EPA realizes catalytic converters are not feasible on high performance engines.

Brunswick makes boats that use engines over 500HP. They commented that the only logical choice for USEPA is to put a cap on the current emission limitations for high-performance engines in order to create a level playing field for those few manufacturers that make high performance engines. Brunswick believes USEPA realizes that catalytic converters are not feasible on high performance engines.

Mercury Marine commented that EPA's proposal recognizes the unique aspects of high-performance engines and will provide the necessary flexibility as long as several additional revisions are implemented. Mercury Marine is supportive of the flexibility provided for high-performance SD/I engines in the proposed rule. Mercury Racing produces High-Performance Engines as a stand alone division, and competes with several small businesses in this market. This is a uniquely American Industry, employing several thousand people between the engine manufacturers, boat builders and dealers. It is imperative that the same standards apply to all manufacturers. That said, several of these measures require additional revision in several respects to ensure that the standards both achieve the reductions that EPA intends as well as remain workable for the high-performance segment.

For CO, EPA is proposing a 350 g/kW-hr standard for high-performance engines. Mercury Marine supports this level and agrees that the technological challenges faced by high-performance engines require a CO standard at that level. Mercury Marine has supplied confidential test data that supports this standard.

EPA suggested that a possible way to reduce emissions from High Performance Engines was to add an air pump. Mercury Marine commented that first, the size of an air pump that would result in any meaningful reductions in emissions would be very large, and require considerable power to drive it. Further, no such pump currently exists. Mercury Racing tested air pumps some years ago, and was unable to get them to survive for more than 90 minutes of operation.

With regard to HC+NOx, EPA requests comments on the need for and level of alternative emissions standards for high-performance SD/I engines. While EPA proposes two possible alternatives, Mercury Marine believes that the most appropriate approach for the high-performance engine segment is a modification of the second suggested alternative, which is a 15-22 g/kW-hr standard for the high-performance segment and disallow credits. 72 Fed. Reg. at 28,117. Mercury Marine recommends instead that EPA adopt a non-catalyst based standard with a cap set at 20 g/kW-hr for engines with rated output of 373 kW-484 kW in 2010 with a further reduction to 16 g/kW-hr in 2011. Mercury Marine will also support a cap of 25 g/kW-hr for engines with rated output of 485 kW and above in 2010 with a further reduction to 22 g/kW-hr in 2018. These recommended levels are based on EPA offering the option of using the modified test cycle described below.

Mercury commented that these standards will provide meaningful reductions in emissions from High Performance Engines. Mercury Racing has tested several existing engines. The current engines in the under 485 kW category have shown HC + NOx values in the range of 11 – 18 g/kW-hr. They believe that there are engines, built by smaller companies, utilizing carburetors that are considerably higher on emissions. Every engine company has access to fuel injection technology, and they believe that a standard that forces the use of better, available, technology is appropriate. By 2011 they are recommending a cap of 16 g/kW-hr.

For the category of over 485 kW, Mercury Racing currently has engines that have shown emissions totals of over 34 g/kW-hr. As with the lower category, they believe that there are carburetor equipped engines being produced by other manufacturers that are considerably higher than this. As previously stated, every engine company has access to fuel injection technology, and Mercury believes that a standard that forces the use of better, available, technology is appropriate. Mercury Racing has been able to calibrate their large engines down to approximately 21 g/kW-hr HC + NOx. Given those results, they endorse a standard set at 25 g/kW-hr HC + NOx for this category in 2010, with a long term reduction to 22 g/kW-hr for 2018.

Sterling Performance is a small business engaged in the building of high performance marine engines and has been in this business for over 20 years. They are involved with racing and pleasure boat engines of the highest performance and durability. The high performance inboard marine sector consists of a very low volume of engines that we estimate the total U.S. annual sales of all builders combined to be less than 1500. These engines are generally used by other small businesses to power the watercraft they sell. Sterling Performance supports the proposal of the removal of the option for allowing the averaging, banking or trading of credits for either HC+NOx or CO. Since they do not produce engines below a rated output of 485 kW, they have nothing with which to average. Sterling asks that only a “level playing field” be considered for all manufacturers of high performance engines. They support a cap of 25 /kW-hr for engines with a rated output of 485 kW and above in model year 2010 with a further reduction to 22 g/kW in model year 2018. In regards to certification testing, the E4 duty cycle overstates the idle fraction and an alternate duty cycle that allows for a nominal load factor of 15% in mode 5 would be more appropriate. With the current ARB standard in place in California, Sterling Performance as a small business is essentially "out of business" in that state. It is of course their hope that the USEPA adopts a standard which will enable them to continue to build engines and further more that it may be harmonized with ARB so that once again the California market is open to them as a small business manufacturer of high performance engines.

California ARB recommends that U.S. EPA remain committed to the 5 g/kW-hr HC+NOx standard and 2009 start-date for high performance sterndrive/inboard engines to align with existing California requirements, or to at least pursue an approach that yields equivalent emission benefits. ARB recognizes the challenges faced by small volume manufacturers of high performance engines to comply with the 5 g/kW-hr HC+NOx standard; however, they have equity concerns over giving a more lenient standard to the segment of industry with the product most able to absorb the costs of compliance. Still, ARB recognizes the benefits of national harmonization and is open to reasonable alternatives that would preserve the emission reductions of the existing spark-ignition marine regulations in California. ARB staff will carefully review the final U.S. EPA decision in this matter and proceed accordingly in determining whether or not a change is warranted for California's high performance engine requirements.

NY DEC commented that high performance engines available to the general public (i.e., not solely for competition) should be held to the same standards as all other sterndrive and inboard engines.

Letters:

Commenter	Document #
NMMA	0688
NY DEC	0659
Ilmor	0658
Sterling	0665
Mercury	0693
CARB	0682
North American Sleekcraft, Inc.	0666
Brunswick Corporation	0695

Our Response:

We considered all the comments and are finalizing non-catalyst based standards for high-performance engines. The final rulemaking sets the HC+NOx emissions standards in 2010 at 20 g/kWh for engines with output less than 485kW and 25 g/kWh for engines with output over 485 kW. In 2011 and later model years, the HC+NOx emission standards drop to 16.0 g/kW-hr for engines at or below 485 kW and 22.0 g/kW-hr for bigger engines. The final standard maintains the proposed 350 g/kWh CO standard that is effective in 2010. Since the standards being adopted for SD/I high-performance engines are less stringent than originally proposed, we are not including the SD/I high-performance engines in the ABT program. Manufacturers are required to meet the emission standards for SD/I high-performance engines without using emission credits.

We respect NY DEC's desire to obtain greater emission reductions in the high performance engine segment; however, we have determined that the SD/I emission standards are not a feasible option for the high performance engines. Catalytic converters, which are required to meet the new SD/I emission standards, are not a viable technology in high performance engines. These engines produce very high exhaust flow rates and temperatures that make catalysts incapable of sustained and effective operation over extended engine operation. We are therefore implementing the most stringent standards achievable through calibration development and the expanded use of electronic fuel injection in high performance engines.

ARB has recently relaxed its exhaust emission standards for SD/I high performance marine engines to be reflective of emission levels that can be attained without the use of catalysts. These emission standards are similar to those finalized today in this rule. To compensate for the associated shortfall in emission reductions, compared to the original standards, ARB is requiring that high-performance vessels use evaporative emission control systems including carbon canisters and low permeation tanks and hoses. Similarly, we are finalizing evaporative emission standards for all SI marine vessels subject to this rule.

3.4.2 Lead time

What Commenters Said:

NMMA commented that the SD/I marine engine manufacturing industry will need lead time to comply with the emissions standards in the proposal. They continued to comment that this is especially true for the high-performance engine segment which will have to develop the technology to ensure compliance with the emissions standards without the use of averaging. The fact that engine manufacturers must comply with the high-performance California emission standards in 2009 does not assure compliance with a model year 2009 implementation date for national emission standards. As EPA states in the preamble, California represents only a small portion of the market and manufacturers will need to develop control technology for their entire product line. This cannot happen overnight and certainly manufacturers cannot begin the process of developing the control technology until the levels of the standards are finalized. Therefore, NMMA supports a model year 2010 implementation date for large businesses.

With regard to small businesses that are in the high-performance segment, NMMA supports the additional compliance time proposed for these manufacturers. They believe that 2011 is appropriate for high-performance small businesses and provides the requisite time for the control technology to be developed and tested. In addition, given that NMMA is recommending no averaging for this segment, the additional years for compliance will be critical for this segment.

Mercury Marine also commented that the SD/I marine engine manufacturing industry will need lead time to comply with the emissions standards in the proposal. This is especially true for the high-performance engine segment which will have to develop the technology to ensure compliance with the emissions standards without the use of averaging. The fact that engine manufacturers must comply with the California emission standards in 2009 does not assure compliance with a model year 2009 implementation date for the federal emission standards. As EPA states in the preamble, California represents only a small portion of the market and Mercury Racing may not offer all products in California in 2009. Therefore, the national rule implementation needs to be at least 2010 to provide sufficient time to develop lower emissions versions of these engines.

With regard to small businesses that are in the high-performance segment, Mercury Marine will support additional time for compliance, but that additional time should be 2011. Allowing all of Mercury Racing's competitors to not comply until 2013 is creating an unfair advantage to these companies which have access to the same technologies and capabilities as Mercury Racing.

NMMA members (North American Sleekcraft, Inc., Lowe Boats, and Cigarette Racing) supported 2010-2011 implementation for catalysts to evaluate and design the lower emission engines into boats while ensuring performance and safety and soundness in economy.

Letters:

Commenter	Document #
NMMA	0688
Mercury Marine	0693
North American Sleekcraft, Inc	0666
Brunswick Corporation	0695
Baja Marine Corporation	0726
Cigarette Racing	0637
Lowe Boats	0660

Our Response:

Given the timing of the final rule, we agree with NMMA's suggestion to delay implementation until 2010 for large businesses. This will allow sufficient lead time to complete the design and certification effort associated with meeting the new emission standards. We however, will maintain the 2013 implementation date for small businesses. Small businesses do not currently have access to the testing equipment necessary to perform emission testing and subsequent emissions calibration. This additional lead time will allow them sufficient time to perform this testing and emissions calibration work. In addition, it will provide them sufficient time to upgrade their carbureted engines to electronic fuel injection. Given the high fuel rates of high performance engines, custom fuel injection systems will need to be developed for many of these engines.

3.4.3 Special provisions for high-performance engines

Summary of Comments	Response
NTE Testing: NMMA and Mercury Marine support the proposal to not to apply NTE requirements to the high performance engine segment. They state that many of the manufacturers in this segment are small businesses and the additional testing will cause significant testing burden and costs.	We will finalize these provisions as proposed. Therefore, we will not apply NTE requirements to the high performance segment.
Certification Testing: NMMA, Mercury Marine, and Ilmor support an alternative E4 test cycle for the high performance engine segment. They propose to increase the idle load at the Mode 5 point in the E4 test cycle from 0% to 15% load. The proposal is based on data from high performance boat builders and owners. The data reflected that high performance vessels spend significantly less time at idle (15%) than the E4 test weighting of 40%. In addition, the data showed that typically 8% of operating time is at idle with no load and 18% of the time is at idle in gear, which is represented by the 15% load proposed at idle.	We will adopt the optional alternate E4 test schedule for the high performance engine segment which allows 15% load at the Mode 5 idle point based on the data supplied by industry. We believe this is sufficient relief for the high performance engine segment based on the data provided by industry.
Portable analyzers: NMMA suggested that portable analyzers do not provide any meaningful relief in testing burden. They stated that this equipment was not developed for the high-performance segment and that discrepancies between portable analyzers and a full test lab would create problems. In addition, NMMA expressed confusion that EPA would refer to portable analyzers for in-use testing of high performance engines given that in-use testing requirements were not proposed for SD/I engines.	We have used currently available portable analyzers to perform valid and accurate measurement of emissions from high performance marine engines. It is true that portable analyzers will in some cases have somewhat greater variability than conventional laboratory equipment. Manufacturers may choose to take this greater variability into account as part of the decision whether or not to use portable analyzers for certification. If compliance margins are not big enough or where engine manufacturers otherwise do not want to deal with this greater availability, they may instead opt for the more expensive testing with conventional laboratory equipment. We note, however, that portable analyzers in some cases meet laboratory specifications, in which case no greater variability would be expected. The final preamble clarifies that EPA is adopting a provision that allows for SD/I high performance engine testing to be performed with different equipment than is specified for the laboratory with less restrictive specifications and tolerances. The less restrictive specifications are typical of the specifications required for in-use testing.
Warranty and Useful Life: NMMA and Mercury Marine support the high performance warranty and useful life limits proposed in the NPRM. The proposal limits warranty and useful life to three years or 150 hours for engines with 373-484 kW output and one year or 50 hours for engines with >485 kW output. They also state that the warranty and useful life limits proposed by EPA are consistent with CARB's limits and it makes sense from a policy and technical perspective to harmonize the	We will finalize the proposed high performance warranty and useful life provisions, which are harmonized with California ARB's provisions.

requirements.	
Broad Definition of Engine Families: Ilmor supports the proposed broad definition of engine families in the NPRM. This proposal allows high performance engine manufacturers to group all high performance engines into a single engine family based on good engineering judgment.	We will finalize the proposed provisions for grouping all high performance engines into a single engine family based on good engineering judgment.

Commenter	Document #
NMMA	0688
Mercury Marine	0693
Ilmor	0658

3.5 Cross-category issues related to emission standards

3.5.1 NTE limits (NTE Testing Burden and Need)

What Commenters Said:

Several commenters stated that they do not support the not-to-exceed (NTE) standards proposed in the regulation. Suzuki does not believe that NTE standards are necessary for the outboard engine product category in general. Honda suggested that EPA reconsider the NTE proposal of this marine engine regulation and not adopt NTE for marine engines. Honda also commented that the NTE section of this marine regulation should address the basic issue of defeat devices and not attempt to create a new undocumented test cycle with infinite test points. NMMA and Mercury suggested that the ABT program ensures that the emissions from a manufacturer's fleet meet the standards, therefore NTE is not necessary.

NMMA, Mercury, and Suzuki commented that the test burden associated with NTE standards is considerable. NMMA and Mercury also claim that the costs associated with the NTE tests are not adequately represented in the draft RIA. The commenters claimed that the practical effect of this requirement is that marine engine manufacturers will have to run hundreds more tests in the development process for engines. Such a resource intensive requirement is a considerable burden for this industry with little to no benefit to the environment.

Yamaha commented that EPA originally explained that NTE was a component of certification only but now wants to utilize it as a form of Selective Enforcement Audit protocol causing undue and unsubstantiated burden on the engine maker.

As an alternative to NTE, Honda suggests that EPA consider the acquisition of data from actual boat use (SD/I, outboard, and PWC with the full variety of engine technology that is available to power these vessels) that represents the nominal and off-nominal operating conditions. The data can be used to define a test procedure that is not infinitely burdensome and can be applied to all marine engine technologies.

Honda does not support adoption of an NTE provision for marine engines. They were not in support of NTE provisions for ATVs in an earlier EPA rulemaking and the fundamental principles behind their opposition then apply here for this marine engine proposal. As an alternative, they would suggest that EPA consider the acquisition of data from actual boat use (SD/I, outboard, and PWC with the full variety of engine technology that is available to power these vessels) that represents the nominal and what is claimed to be off nominal operating conditions. From this data it may be determined that the extremes of operating conditions can be better defined. The data can also be used to define a test procedure that is not infinitely burdensome and can be applied to all marine engine technologies. On-the-water test procedures are also a section in the proposal where EPA is attempting to create a compliance limit when there is no test data, no test procedure, no hardware input and output parameters, and no basis to assume that there is some actual, reliably measurable, data that could be generated and compared with a dynamometer test. This is the basis for Honda's suggestion that the NTE section of this marine regulation should address the basic issue of defeat devices and not attempt to create a new undocumented test cycle.

Honda does not understand how the NTE sections apply specifically to outboards and PWCs. They assume that EPA may have intended that some of these sections apply only to SDI vessels. Outboards and PWC do not necessarily include any sensors or controls in a basic 4-stroke carbureted engine so including them in this requirement, especially torque value broadcasting, would be a complete change in their configuration clearly not anticipated in either the regulatory implementation date nor in the cost analysis associated with the emission reductions. Without engine management, a simple air / fuel map of the engine in the operating range would be sufficient to demonstrate that the engine will provide proper emission performance and not introduce any form of "defeat device". The basic purpose of NTE is to prevent the use of a defeat device that would impair emissions performance under normal operating condition or, under particular conditions, change the engine performance for some other benefit while adversely affecting emissions. EPA seems to have clearly stepped beyond this purpose and is in effect creating a new engine test cycle with infinite test points. Creating a new test cycle and setting standards for that cycle without real world data demonstrating that it is representative of boats in operation and is technically achievable by the boats / engines being regulated are clearly a violation of the basic technical principles upon which EPA has always developed test cycles.

ARB commended U.S. EPA for its leadership role in developing and adopting NTE standards and test procedures for sterndrive/inboard engines. ARB believes the standards will allow sterndrive/inboard engine performance to be evaluated in-use under real-world operation. ARB staff recognizes the value to industry of harmonized requirements and will carefully review U.S. EPA's NTE program when determining what NTE standards are appropriate for California's own program.

Letters:

Commenter	Document #
NMMA	0688
Bombardier	0674
Yamaha	0721
Mercury	0693
Suzuki	0698
CARB	0682
Honda	0705

Our Response:

We disagree with commenters' position that NTE is unnecessary. NTE is a critical part of a comprehensive emissions program that is intended to ensure that emission controls function with relative consistency across the full range of expected operating conditions. Without NTE, we would not be able to ensure the emissions benefits expected from the regulation are realized in-use.

Commenters stated that the ABT program ensures that emissions from a manufacturer's fleet meet the standards and therefore NTE is not required. However, the commenter did not explain their perceived relationship between ABT and NTE. These are two very different programs. ABT refers to emission credit exchanges between different engines. NTE is a set of standard test procedures intended to ensure that emission control is achieved in–use.

We disagree with Honda's comment that NTE should solely address the use of defeat devices. No single test procedure or test cycle can cover all real-world applications, operations, or conditions. Yet to ensure that emission standards are providing the intended benefits in use, we must have a reasonable expectation that emissions under real-world conditions reflect those measured on the test procedure. The defeat device prohibition is designed to ensure that emission controls are employed during real-world operation and as a result emission reductions are achieved in the real world, not just under laboratory testing conditions. However, the defeat device prohibition is not a quantified standard and does not have an associated test procedure, so it does not have the clear objectivity and ready enforceability of a numerical standard and test procedure. We believe using the traditional approach, i.e., using only a standardized laboratory test procedure and test cycle, makes it difficult to ensure that engines will operate with the same level of control in use as in the laboratory and therefore makes it difficult to enforce a defeat device prohibition. Thus, we believe there are significant advantages to establishing NTE standards. In addition, the final NTE test procedure is flexible, so it can represent the majority of in-use engine operation and ambient conditions. The NTE approach thus takes all the benefits of a numerical standard and test procedure and expands it to cover a broad range of conditions. With the NTE approach, in-use testing and compliance become much easier because emissions may be sampled during normal boating. In sum, by establishing an objective measurement, our NTE approach makes enforcement of defeat device provisions easier, provides more certainty to EPA and the industry, and is crafted to be flexible and represent most in-use engine operation and ambient conditions.

We disagree with industry's comments that the test burden associated with NTE is considerable with either current or future engines. Data supplied by manufacturers show that emissions from existing low emission engines in many areas of the NTE zone are generally below the limit today. We believe the technology used to meet the standards over the five-mode duty cycle will meet the caps that apply across the NTE zone. We therefore do not expect the final NTE standards to cause manufacturers to need additional technology. We believe the NTE standard will not result in a large amount of additional testing, because these engines should be designed to perform as well in use as they do over the five-mode test. However, our cost analysis in the Final RIA accounts for some additional testing, especially in the early years, to provide manufacturers with assurance that their engines will meet the NTE requirements and therefore meet applicable standards in-use.

The test burden also will not be as great as industry assumed from the proposal because of the lead time and carry-over provisions permitted in the final regulation. Manufacturers have at least two years to develop efficient NTE test methods that focus on areas of high emissions before NTE is required. We also added a small business provision that allows an additional year of lead time. We exempted the high performance engine segment from NTE testing altogether because we have very limited information on their detailed emission characteristics and we are concerned about extent of testing that would be required by the large number of affected engine manufacturers that are small businesses. We also considered testing burden by allowing manufacturers to carry-over certification on engines certified prior to 2010 until 2012 for OB engines and 2013 for PWC and SD/I. Like emissions certification, the manufacturers will be able to carry-over NTE certification until the engine design changes significantly.

We also disagree that the NTE testing burden is not accounted for properly in the RIA. In the RIA Chapter 6.3.5, we recognized that manufacturers may need to adjust engine calibrations to meet the proposed standard and collect further data to demonstrate compliance with the proposed not-to-exceed zone. We therefore allow on average two months of R&D for each engine family as part of the certification process. Considering two engineers and three technicians and the corresponding testing costs for the two-month period, we estimate a total cost of $130,000 per engine family. Unless engine designs were significantly changed, manufacturers could recertify engine families each year using carryover of this original test data. Commenters did not provide detailed information on their cost estimates for NTE testing.

Honda commented that actual in-use boat data should be used to create the NTE zone. We developed this zone based on the range of conditions that these engines typically see in use. Manufacturers collected data on several engines installed on vessels and operated under light and heavy load. Chapter 4 of the Final RIA presents this data and describes the development of the boundaries and conditions associated with the NTE zone. Although significant in-use engine operation occurs at low speeds, we are excluding operation below 40 percent of maximum test speed because brake-specific emissions increase dramatically as power approaches zero. An NTE limit for low-speed or low-power operation will be very hard for manufacturers and EPA to implement in a meaningful way.

We value CARB's support for our NTE testing and we agree with them on the value of harmonized requirements for NTE test protocol and standards.

3.5.2 Lead time for NTE standards

NMMA and Mercury Marine commented that there are certain NTE implementation issues that EPA's proposal fails to consider and accommodate in the proposed requirements for Marine SI engine manufacturers in § 1045.205. Specifically, the requirement in § 1045.205(p) that the application for certification contain a statement that all the engines in the engine family comply with the NTE limits and the requirement to include any relevant testing, engineering analysis, or other information to support the statement is particularly troublesome. 72 Fed. Reg. at 28,270. While this requirement may not be a problem for new engine families, for engine families that are carried over, EPA must delay the NTE requirements in the certification application. Otherwise, manufacturers would have the impossible task of having to retest all of their engine families, including those that existed prior to the applicability of the NTE standards. To address the carryover situation, NMMA and Mercury recommend that EPA include in § 1045.205(p) language that would specify that test data for carryover engines compliant with the standards can be carried over through model year 2014 and that certification is valid until the engines must be recertified for other reasons. Section 1045.205(p) should be revised to state:

> (p) For new engine families, state that all the engines in the engine family comply with the not-to-exceed emission standards we specify in subpart B of this part for all normal operation and use when tested as specified in § 1045.515. Describe any relevant testing, engineering analysis, or other information in sufficient detail to support your statement. Through model year 2014, any prior model year engine certified under the Tier I standards in Part 91 may carry over test data and is not subject to NTE as long as the engine meets the applicable standards in this subpart.

This additional language will ensure that manufacturers will be able to transition to the new standards without having to retest all of their prior engine families that are already compliant with the standards.

Mercury commented that they have a suggestion on the NTE Zone Implementation that may make it easier to come to an agreement and implement. Whatever approach is put in the rule, for 2010, 2011, 2012 manufacturers would test to it and report the results with new certifications. They would make a good faith effort to comply with it, but there would be no penalty for noncompliance. Then, in 2012, EPA and industry would do a tech. review and see what worked and what didn't, modify it as needed, and future new certifications would need to meet it. This is similar to the concept that CARB is using on catalyst monitoring, where for the first two years, industry has to do catalyst monitoring and store fault codes, but they do not have to activate the warning horn/MIL light.

Provided EPA adopts the current 3-Star California exhaust emission standard for PWC and Outboards, BRP can fully comply with this standard in MY2009 if EPA allows carry-over data to be used. It is not possible for BRP to re-test their PWC or Outboard engines for compliance with the proposed Not To Exceed (NTE) Zone requirements or proposed change to the maximum test speed in time for MY2009 certification. As a result, BRP is supportive of the NMMA comment to exempt carry-over engine families from the NTE and maximum test speed provisions in this regulation through MY2013. Please refer to the carry-over certification discussion below.

BRP supports NMMA proposal to have carry-over engine families from the existing marine regulation and early-certified engine families meeting the exhaust emission standards of the proposed regulation be exempt from the proposed NTE test requirements and maximum test speed definition change through MY2013. It is necessary for BRP to phase in engine families to the new testing requirements over the next few model years. It is infeasible to re-test every engine family within the next couple years to verify compliance with the NTE proposal. In addition, allowing carry-over data to be exempt from the NTE and maximum test speed provisions will create an incentive for BRP and other manufacturers to certify their engine families to the new emissions standards in an earlier model year.

Yamaha supports NMMA comments that all HC+NOx compliant engine families under Tier 1 not be subject to NTE testing until that family undergoes a major change or resubmitted as new model until M/Y 2014. This will help offset the time and costs associated with an NTE test.

Letters:

Commenter	Document #
Bombardier	0674
Yamaha	0721
Mercury	0693
NMMA	0688
Mercury	0693
Mercury	0716

Our Response:

Manufacturers commented that certification to the NTE standards requires additional testing for engine models that are already certified to the new emission standards for California. In addition, they expressed concern that they may need to recalibrate existing engine models to meet the NTE standards. Manufacturers commented that this would not be possible by the date of the duty cycle standard. For engines already certified in California, manufacturers carry over preexisting certification test data from year to year. Manufacturers commented that additional time would be necessary to retest, and potentially recalibrate, these engines for certification to the NTE standards. To address these issues regarding lead time needed to retest these engines, we are not applying the NTE standards for 2010-2012 model year engines that are certified using preexisting data (i.e., carryover engine families). For new engine models, manufacturers indicated that they will be able to perform the NTE testing and duty-cycle testing as part of their efforts to certify to the new standards. Therefore the primary implementation date of 2010 applies to these engines. Beginning in the 2013 model year, all OB/PWC and conventional SD/I engines must be certified to meet the NTE standards.

We believe that the NTE requirements are technologically feasible in the time frame adopted in this rule. These NTE limits are supported by data in the RIA and have been further confirmed by confidential data submitted by individual manufacturers. Therefore, we do not believe that a tech review is warranted.

3.5.3 NTE zones, subzones, and test specifications

What Commenters Said:

NMMA, Mercury, and Bombadier commented that EPA's proposed NTE requirements do not reflect how marine engines are certified and designed and do not accommodate the majority of engine designs. They stated that exhaust emissions vary by engine technology across the 5- mode weighted average test cycle used to determine Marine SI emission certification levels. In addition, the commenters stated that the emission levels at each of the five test points can vary significantly from the declared FEL. The commenters believe that EPA's NTE proposal forces an area around each point of the certification duty cycle to meet the engine family's FEL times a multiplier regardless of the certification data for that point. Suzuki commented that their full line of outboard engines comply with the stringent CARB 2008 HC+NOx levels but EPA's proposed NTE test requirements and emissions standards under any of the available NTE subzone sets will be too severe for several existing engine families to attain without costly and time consuming redesign.

NMMA, Pleasurecraft Marine, Indmar, Mercury Marine, Bombardier, Volvo Penta, and Suzuki support using the second alternative discussed in the NPRM preamble, which is a weighted average approach to the NTE limit rather than an individual NTE limit for each subzone. Under this approach, an emission measurement would be made anywhere within each of the subzones plus idle. The measured emissions would then be combined using the weighting factors for the E4 modal test. The commenters believe that the proposed alternative NTE Zone will ensure a common test methodology to test all different types of marine engines.

NMMA has provided EPA with a full description of a NTE zone shape that they believe makes sense for all engine categories and addresses the open loop phase of catalyst operation during the marine duty cycle. The proposed shape of the subzones was supported by industry. NMMA's proposed a dividing line for Subzone 1 at 85% engine speed and 80% engine torque to accommodate all Marine SI technologies, including open-loop fueling for catalyst protection in the SD/I engines. They proposed that Subzones 2 and 3 are defined by the ICOMIA 5-mode cycle, but the wide open throttle point was defined by the 85% speed and 80% torque boundary of Subzone 1. NMMA proposed the lower boundary for Subzone 2 at 68% of rated test speed and Subzone 3 at 51% of rated test speed. Subzone 4 is defined as the remaining areas of the NTE zone.

Bombardier commented that EPA's NTE proposal forces an area around each point of the certification duty cycle to meet the engine family's FEL times a multiplier regardless of the certification data for that point. They also stated that despite the three sets of multipliers available, this is not a proposal BRP can comply with without substantial lead time. BRP desired to meet with EPA and other industry members to reach a consensus on the NTE requirements.

Mercury stated that the key to ensuring that the NTE limits will be workable for all engine categories is to have a multiplier that will allow for the “worst case” engines. Otherwise, they believe EPA would need to develop subgroups to accommodate every engine category. Mercury Marine believes that a multiplier of 2.0 with the weighted zone approach is required to make this concept work.

Assuming the proposed weighted-average test method is adopted, Suzuki believes an appropriate NTE multiplier for 4-stroke outboard motors is 1.6 times the certification FEL for HC+NOx and CO emissions. Suzuki believes this proposed multiplier will accomplish EPA's stated objectives for NTE, and will not penalize small 4-stroke outboard engines that that are not equipped with fuel injection.

Yamaha’s PLT testing indicates that the multipliers outlined in the proposal are too stringent when applying to PLT tests of various engine technologies and fuel delivery methods with little or no break-in time beyond what is allowed for current PLT preparation. Yamaha recommends NTE multipliers of 1.5 times the FEL (un-weighted).

Manufacturers have commented that do not have enough information to fully evaluate the feasibility of the NTE zone for future SD/I engines. Manufacturers have expressed concern that the new line of supercharged GM will result in engines with higher exhaust temperatures than current designs. The commenters suggest that higher exhaust temperatures may require open loop fuel operation at lower speeds and loads, including some operation in subzone 2.

Several manufacturers submitted data for our analysis and development of multipliers. The data can be found in the RIA Chapter 4.

Letters:

Commenter	Document #
NMMA	0688
Indmar	0667
Bombardier	0674
Mercury	0693
Suzuki	0698
Pleasurecraft Marine (hearing)	0642

Our Response:

We have re-worked the NTE test protocol with industry to develop a new approach. The proposal discussed several approaches to the NTE testing protocol. We requested comment from industry on several alternatives. Industry commenters provided input to the advantages and shortcomings of these approaches. Manufacturers specifically stated that there are many different engine technologies and suggested high multipliers that could be met by existing engines. We continued to work with the manufacturers since they submitted their written comments to address these important issues.

The OB/PWC NTE multipliers are slightly revised from the proposed procedure to better reflect the emissions performance of four stroke engines. We are raising the HC+NOx limit in Subzones 1, 2, and 3 from 1.2 to 1.4. In the event where OB/PWC engines are fitted with catalysts, manufacturers would use the NTE requirements for catalyzed engines that were originally designed for SD/I engines (with catalysts). This is appropriate because the emissions characteristics for engines equipped catalysts, in the NTE zone, are driven primarily by the catalyst efficiency rather than the engine calibration. This is especially true at high speed/power operation when the engine may need to run rich as a catalyst protection strategy. During this rich operation, the catalyst would not effectively reduce HC or CO. Detailed data is included in the RIA Chapter 4.

The two-stroke OB/PWC engines have apparent high engine operation variability, as stated in the proposal. Therefore, we singled out the two-stroke engines based on industry recommendation. We are adopting a single weighted limit of 1.5 times FEL for the entire zone.

Four-stroke SD/I engines are unique from the OB/PWC engines because they are expected to use a catalyst to meet the new standards. We are adopting changes to the subzone shapes for SD/I in the final rule based on industry comments. First, we are modifying the shape of the NTE zone to reflect the emissions performance differences between open loop and closed loop fuel operations. We are combining subzones 2, 3, and 4 into a single subzone to reflect the common closed loop engine operation in these areas. Second, we are increasing the subzone 1 area to address the points that require open loop fuel operation to maintain safe exhaust temperatures based on data from industry. We believe that the finalized subzone 1 area is properly defined for catalyst-equipped engines based on current engine blocks. In addition, initial data from General Motors indicates that the finalized subzone 1 may also be appropriate for 6.0L supercharged engines. However, this is not certain. As engine manufacturers begin their development of the new catalyst-equipped, supercharged, SD/I engines, more information will become available on the exhaust temperature characteristics of these engines. If it becomes apparent that these engines cannot be designed to meet the NTE requirements, then we would consider revisiting the NTE subzones and limits to address this issue.

3.5.4 Altitude

What Commenters Said:

ARB strongly encourages U.S. EPA to withdraw its proposal for exempting all recreational marine engines from compliance with emission standards at altitudes greater than 2000 feet above sea level (< 94 kPa) as described in Section IV.D.(4) of the preamble. Although the preamble justifies this limitation because of a presumed majority of boating activity at sea level or low altitude, many lakes in California popular to boaters reside significantly above 2000 feet. Examples include Lake Tahoe at 6225 feet above sea level, Lake June at 7612 feet above sea level, and Big Bear Lake at 6743 feet above sea level. Furthermore, the proposed altitude limitation would effectively exempt recreational marine engines from having to comply with emission standards in-use for all of New Mexico, Wyoming, Utah, and Colorado, which reside entirely at or above 2000 feet above sea level. Additionally, fourteen U.S. states in total have a mean elevation at or above 2000 feet above sea level. While ARB understands that requiring manufacturers to perform certification testing at high altitudes may be inconvenient, they maintain that manufacturers must remain liable for complying with emission standards in-use, as feasible, at all elevations where significant boating activity occurs. As a compromise, ARB recommends allowing manufacturers to certify engines using test data generated at or around 2000 feet above sea level, but to provide an engineering evaluation stating that the engine will still comply with the applicable emission standards up to 8000 feet above sea level. Requests for exemptions from the 8000 feet above sea level threshold could be considered on a case-by-case basis.

Letters:

Commenter	Document #
CARB	0682

Our Response:

We acknowledge that there are lakes at elevations greater than 2000 feet above sea level. While this boating activity is less prominent than that occurring at lower altitudes, we agree that the regulations should not automatically exempt marine engines based on operation above 2000 feet of altitude. For electronically controlled engines with feedback controls, designing engines that can compensate for altitude effects is straightforward. The bigger challenge is for open-loop engines where there is much less opportunity to incorporate design parameters that would compensate for altitude effects.

In discussions with engine manufacturers after the proposal, there was general agreement that the approach we proposed for nonhandheld Small SI engines would be appropriate to extend to Marine SI engines. We are therefore adopting those same requirements for Marine SI engines in the final rule. In summary, this would include the following provisions:

- Engines must comply with emission standards in the standard configuration at all atmospheric pressures above 94 kPa, which generally corresponds to an altitude of 2000 feet above sea level.
- Engines must comply with emission standards at atmospheric pressures above 80 kPa, which generally corresponds to an altitude of about 6400 feet above sea level. This may involve an altitude kit, which would be described in the application for certification with supporting information (engineering analysis and/or test data). This atmospheric pressure is the lowest value for performing a valid test under 40 CFR part 1065.
- Manufacturers must describe their plan for making information and parts available to reasonably expect that altitude kits would be widely used in high-altitude areas if the engine depends on such a kit for complying at high altitudes.

See the discussion of altitude-related comments for Small SI engines in Section 2.2.7 for additional information.

3.5.5 Methane measurement

What Commenters Said:

CARB commented that although not in alignment with California's existing regulations for outboard/personal watercraft and sterndrive/inboard engines, the use of a total hydrocarbon (THC) criterion for determining compliance with the HC+NOx standards is not opposed by ARB since a numerically equivalent THC standard would be more stringent than basing compliance on only the reactive component of hydrocarbon emissions. California's existing recreational marine standards are based solely on non-methane hydrocarbon because methane is not an ozone precursor. However, methane is a greenhouse gas with climate changing potential; therefore, inclusion in the HC+NOx standard could be beneficial if methane emissions are always decreased in proportion to non-methane components regardless of the emissions control technology employed. As an alternative to the present proposal, U.S. EPA might consider the adoption of a separate standard for methane to ensure more meaningful emission reduction levels.

Letters:

Commenter	Document #
CARB	0682

Our Response:

Whether one considers ease of measurement, climate change, or matching the form of the standard with the available emission control technologies, the conclusion is that a total hydrocarbon standard is a sound basis for setting emission standards for Marine SI engines. We agree with the observation that methane emissions will decrease as a result of setting a THC standard. We are adopting emission standards in the form of total hydrocarbons, as proposed.

3.6 Averaging, banking, and trading

What Commenters Said:

NMMA and Mercury Marine supported the inclusion of an Averaging, Banking and Trading Program for OB/PWC engines and also for SD/I engines.

CARB encouraged EPA to rescind provisions for emission credit banking and trading for all recreational marine engines or to at least depreciate the value of banked credits over time. They expressed concern that it may be possible for manufacturers to certify their engines to emission levels that are considerably lower than required, even within proposed family emission limit (FEL) caps, which could delay the introduction of more stringent emission standards in the future for some manufacturers (if enough credits have been banked). CARB noted that the EPA makes a similar argument for disallowing the banking of CO credits from outboard/personal watercraft engines, and stated that the argument is applicable to the other regulated pollutants as well as sterndrive/inboard engines.

Letters:

Commenter	Document #
NMMA	0688
Mercury	0693
CARB	0682

Our Response:

EPA is retaining the ABT programs for Marine SI engines in the final rule. There will be one ABT program for OB/PWC engines and a separate ABT program for SD/I engines at or below 373 kW. The ABT program for OB/PWC engines will include averaging, banking and trading provisions for the HC+NOx standard and averaging provisions only for the CO standard. The ABT program for SD/I engines at or below 373 kW will include averaging, banking and trading provisions for both the HC+NOx standard and the CO standard. (As described in Section 3.4.1, EPA is finalizing a set of emission standards for high performance SD/I engines that do not include ABT provisions.) EPA believes ABT programs are an important element in setting emission standards that are appropriate under Clean Air Act section 213(a) with regard to technological feasibility, lead time, and cost, given the variety of engines covered by the Marine SI standards. Depending on their design, ABT programs can create an incentive for the early introduction of new technology, allowing certain engine families to act as trailblazers for new technology. This can help provide valuable information to manufacturers on the technology before they apply the technology throughout their product line.

EPA believes the banking and trading provisions are important parts of the ABT program for the HC+NOx and CO standards for SD/I engines at or below 373 kW and the HC+NOx standard for OB/PWC engines and we are retaining them for final rule. (As noted in the proposal, EPA does not believe banking and trading provisions are appropriate for the CO standards being applied to OB/PWC engines given the level of the CO standard.) Banking provisions, including early banking provisions (discussed below in Section 3.6.4), create an incentive for manufacturers to go beyond the requirements set by EPA and also create an incentive for early introduction of new technology. EPA believes this behavior should be encouraged because early introduction can also secure earlier emission benefits. With regard to trading, EPA believes that trading can help manufacturers that, for whatever reason, are struggling with meeting the standards. Trading has happened very infrequently under EPA's ABT programs, most likely due to cost and competitiveness issues. However, it could prove very useful to a company that is having short-term difficulty with complying with the standards, where other means of addressing the problem do not exist.

3.6.1 Credit life

What Commenters Said:

NMMA and Mercury Marine both supported the proposal to use an unlimited credit life for credits used in the ABT Programs for both OB/PWC engines and SD/I engines. In the event that EPA determines it is necessary to limit the credit life, NMMA and Mercury Marine commented that EPA should apply the alternative approach suggested in the preamble, which would be to limit the credit life to the regulatory useful life of the engine. This would mean that the credits generated by a particular engine would be available while that particular engine is in the fleet. This would avoid concerns voiced by EPA in the preamble about credits being used years after the engine that generated the credits is no longer in the fleet. Moreover, NMMA and Mercury Marine noted that the ability to continue to carry over credits generated in the existing ABT program for OB/PWC engines into the new ABT program rewards manufacturers that have produced engines cleaner than the standards.

CARB commented that it would support the limitation of credits based on the useful life of the engine as proposed. Further, CARB recommended that previously banked credits not be applicable for use on models after a change in standards has occurred.

Letters:

Commenter	Document #
NMMA	0688
Mercury	0693
CARB	0682

Our Response:

We are retaining the unlimited lifetime for ABT credits under the Marine SI ABT program, as proposed. While EPA is retaining the unlimited lifetime, EPA notes that manufacturers should not assume that these credits will be available without any restrictions on their use if, and when, EPA should consider a new round of emission standards in the future. In revising emission standards, section 213(a)(3) of the CAA requires EPA to set standards which achieve the greatest degree of emission reduction that is technologically achievable, taking into consideration such items such as cost, safety and lead time. If manufacturers have a large pool of ABT credits available to them, EPA must consider ways to ensure that those credits do not result in an unnecessary delay of the standards. This can be done in a variety of ways, and has been done in other ABT programs by allowing only limited numbers of existing credits to be used for a limited period of time during the transition to the new standards.

EPA does not believe a limit on the life of the credits is needed for the Marine SI ABT program adopted with today’s program. Credits are generated at a cost to manufacturers and thus they have a value to the manufacturers. Provisions which limit a manufacturer’s ability to use credits, such as a limit on credit life, will reduce the incentive for manufacturers to invest in the development and introduction of new technology. As mentioned above, manufacturers should not assume that an unlimited life means the credits will be available without any restrictions on their use if, and when, EPA should consider a new round of emission standards in the future. EPA would expect to consider ways to ensure that existing credits would not result in an unnecessary delay of any future standards.

3.6.2 Averaging sets and other restrictions

What Commenters Said:

NMMA commented that the ability of engine manufacturers to use credits interchangeably between OB and PWC engines is important in ensuring compliance with the standards.

NMMA and Mercury Marine commented that it is critical that jet boats be allowed to average credits, both HC+NOx and CO, with OB/PWC engines to provide flexibility and to ensure that jet boats will be able to meet the SD/I emission standards. NMMA noted its support of the proposed approach discussed in the preamble and in the proposed regulatory text in §1045.701(d), provided CO averaging was included.

Bombardier commented that it supported the proposed corporate averaging provisions in §1045.701(d) which allows SD/I engines certified under §1045.660 for jet boats to use HC+NOx exhaust credits generated from OB/PWC engines, as long as the credit-using engine is the same model as an engine model from an OB/PWC family. However, for the corporate averaging provision of §1045.701(d) to be meaningful to a manufacturer, Bombardier commented that CO averaging is also essential for achieving compliance. In addition, Bombardier premised their comments on the feasibility of having their jet boat models comply with the SD/I standards beginning with MY2011 (see Section 3.2.3, above) on the basis that §1045.701(d) is expanded to allow CO averaging.

NMMA and Mercury Marine recommended that EPA remove the restriction regarding the ability of an engine to earn credits for one pollutant when using credits to comply with the emissions standard for another pollutant for both OB/PWC engines and SD/I engines. They commented that this restriction does not serve any useful purpose. From an emission reduction perspective, EPA will still see the pollution reduction across a manufacturer's fleet even with the restriction lifted. NMMA and Mercury marine noted that EPA's rationale for this restriction is that it has been imposed in other programs and is therefore justified for the marine engine category. They do not believe this is a sound basis for such a restriction. NMMA commented that U.S. Coast Guard (USCG) data demonstrates that an averaging approach to controlling emissions results in emission reductions. Thus, NMMA believes a restriction is unnecessary from an environmental perspective.

From a technical perspective, NMMA and Mercury Marine commented that this proposed restriction unduly penalizes certain engines in manufacturers' fleets. For example, for OB/PWC engines, some direct injection two-stroke engines have very low CO emissions but have higher HC+NOx emissions. Mercury Marine noted that many DI 2-Stroke Engines are borderline on meeting the standard for HC+NOx, but have extremely low CO emissions, usually under 100 g/kW-hr.) Thus, these engines would have to use HC+NOx credits for compliance but would be ineligible to generate CO credits. NMAA commented that the inability to earn CO credits for these engines will have a significant impact on certain manufacturer's product plans developed to assure compliance with the standards.

With regard to the proposed restriction for SD/I engines, Mercury Marine commented that GM will be launching a new base engine in 2010 (6.0 L S/C) that may be negatively impacted by this approach. The supercharged engine may need to run rich of stoichiometric at

Mode 2 and may be high on CO emissions at that point. Mercury Marine note they are forced to use GM base engines as they are the only ones that fit within the tight packaging requirements of the boat builders.

As noted earlier at the beginning of Section 3.6, CARB commented that EPA should rescind the provisions for credit banking and trading. Should EPA decide to keep the banking and trading provisions for marine engines, CARB encouraged EPA to depreciate the value of banked credits over time. CARB is concerned that it may be possible for manufacturers to certify engines to emission levels that are considerably lower than required, even within proposed family emission limit (FEL) caps, which could delay the introduction of more stringent emission standards in the future for some manufacturers (if enough credits have been banked). They noted that EPA made a similar argument for disallowing the banking of CO credits from OB/PWC engines, and CARB believes the argument is applicable to the other regulated pollutants as well as SD/I engines.

CARB also recommended that cross class trading not be allowed. Finally, CARB recommended that deficits not be carried over to future years without significant penalties.

Letters:

Commenter	Document #
NMMA	0688
Mercury	0693
CARB	0682
Bombardier (hearing)	0642
Bombardier	0674

Our Response:

With regard to the averaging sets for the Marine SI ABT program, EPA is adopting two averaging sets. OB/PWC engines will be in one averaging set. SD/I engines at or below 373 kW will be in another averaging set. (As discussed in Section 3.4.1, the final regulations for high-performance SD/I engines do not include ABT.) There will be no mixing of credits between the two sets of engines, except under certain conditions for jet boat engines. Jet boat engines are subject to the SD/I engine standards. Manufacturers will be able to use credits generated from OB/PWC engines to demonstrate that their jet boat engines meet the HC+NOx and CO standards for SD/I engines. Engine manufacturers can only use this provision if the majority of units sold in the United States from those related engine families are sold for use as OB/PWC engines. Finally, the manufacturer must certify these jet boat engines to an FEL at or below the applicable emission standards for a similarly-powered OB/PWC engine. While the preamble to the proposal noted manufacturers could use this special provision for jet boat engines for demonstrating compliance with both the HC+NOx standard and the CO standard, the proposed regulations failed to include a reference for CO. The reference to the CO standard has been included in the regulations for the final rule.

With regard to restriction regarding the ability of an engine to earn credits for one pollutant when using credits to comply with the emissions standard for another pollutant, EPA is dropping that provision for the final rule. While EPA proposed such a restriction, it was modeled on similar requirements in other ABT programs where there was concern that a manufacturer could use technologies to reduce one pollutant while increasing another pollutant. In such cases, EPA did not want to allow manufacturers to both generate credits for one pollutant while using credits for another pollutant. In order to comply with the standards applicable to OB/PWC engines and SD/I engines at or below 373 kW, the types of technologies manufacturers are expected to use technologies such as direct-injection 2-stroke engines or 4-stroke engines for OB/PWC engines and catalysts along with engine improvements for SD/I engines. All of these technologies should result in reductions in both HC+NOx emissions and CO emissions compared to current designs. While the technologies are expected to reduce both HC+NOx emissions and CO emissions, there could be situations where these technologies are capable of meeting one of the emission standards but not the other. EPA does not want to preclude such engines from being able to certify using the provisions of the ABT program and is therefore dropping the proposed restriction from the final rule.

With regard to comments on discounting of emission credits, we are not adopting such provisions for the ABT program. Discounting emission credits is similar to limiting the lifetime of credits. Both provisions lower the value of a credit to a manufacturer. As noted earlier in the discussion on credit lifetime, EPA believes that emission credits are generated at a cost to manufacturers and thus they have a value to the manufacturers. Provisions which limit a manufacturer’s ability to use credits, such as a “significant” discount, will reduce the incentive for manufacturers to invest in the development and introduction of new technology, which is a key goal of an ABT program.

In response to the comments on credits deficits, it can be noted that EPA did not propose to allow credits deficits under the Marine SI ABT program. EPA is not including any deficit provision in the final regulations for the Marine SI ABT program.

3.6.3 FEL caps

What Commenters Said:

Mercury Marine commented that the FEL cap for jet boat engines should be the same as the FEL cap for OB/PWC engines because jet boat engines are derived from these products.

Bombardier noted that it is supportive of the effort to develop alternative fuels to reduce petroleum-based fuels consumption. Bombardier commented that EPA has proposed maximum FEL caps for marine engines which may impede a manufacturer's effort to provide alternative fueled marine engines. Bombardier requested that engines using fuels other than gasoline, alcohol and natural gas be exempt from the HC+NOx maximum FEL proposed in 40 CFR 1045.103 (b)(1). Because these engine families would still be subject to the proposed corporate averaging requirements, any increase in HC+NOx emissions would be off-set by further HC+NOx reductions of other engine families. Bombardier reasoned that this change would be an emission neutral (or beneficial) change to the regulation, and would help support a manufacturer's efforts to develop alternatively fueled marine engines.

Letters:

Commenter	Document #
Mercury	0693
Bombardier	0674

Our Response:

As proposed, we are classifying jet boat engines as part of the SD/I engine category, subject to the SD/I standards. However, because many jet boats, today, use OB/PWC engines, we are providing additional regulatory flexibility in which limited jet boat engines may be certified using OB/PWC emission credits. To be eligible for this flexibility, the jet boat engines must meet the OB/PWC standards. We believe that this FEL cap is necessary to limit the degree to which manufacturers may take advantage of emission credits to produce engines that are emitting at higher levels than competitive SD/I engines.

The purpose of the FEL cap is to prevent the sale of very high-emitting engines. As discussed in Chapter 4 of the RIA, engine manufacturers already certify the majority of their engines using FELs well below the new FEL cap. This cap can be met through the use of simple four-stroke engines or direct-injection two-stroke engines. Bombardier did not comment on what alternative fuel they were referring to or why engines operating on this fuel could not meet the HC+NOx cap. In addition, Bombardier did not present a rationale why high-emitting engines using this fuel would be more acceptable than other high-emitting engines. Therefore, we are retaining the HC+NOx FEL cap for all OB/PWC Marine SI engines.

3.6.4 Early credits for SD/I engines

What Commenters Said:

NMMA and Mercury Marine supported the Early Credit Program because it encourages SD/I manufacturers to expedite the introduction of catalyst-equipped engines nationwide earlier than what would be required in the regulation, which results in an environmental benefit. Mercury Marine noted that it plans to offer only catalyst-equipped versions of its Towed Sports (Water Ski Boats) engines in 2009, as this market is sensitive to CO emissions. NMMA and Mercury Marine also recommended that EPA allow manufacturers to earn early credits for engines that meet either the HC+NOx standard or the CO standard.

NMMA and Mercury Marine commented that another important change that would need to be made to any Early Credit Program is to ensure that the timing for the program coincides with any adjustment to the implementation date for the standards. (In comments summarized in Section 3.2, NMMA and Mercury Marine commented that the 2009 model year implementation date for the SD/I exhaust standards was not realistic for the marine industry. NMMA and Mercury Marine recommended a 2010 compliance date for most of the SD/I engines, with a 2011 implementation date for the GM replacement engines. NMMA also recommended a 2011 implementation date for PWC engines installed in jet boats.) In order for an Early Credit

Program to be useful, NMMA and Mercury Marine commented that EPA would need to adjust the period to reflect any changes made to the implementation date.

CARB recommended against the adoption of early introduction multipliers for the generation of credits from SD/I engines.

Although CARB opposes the banking and trading of emission credits, CARB commented that the prohibition in 1045.145(b)(6) against the early banking of emission credits for SD/I engines sold in California before 2009 should be amended or rescinded altogether if EPA decides to implement the ABT program as proposed. CARB understands that EPA does not want to allow credits to be generated from engines that are already required to meet cleaner emission standards in California. However, the blanket prohibition creates a disincentive for manufacturers to sell cleaner engines in California beyond what is already required. Furthermore, CARB noted that it does not allow credit banking or trading for spark-ignition recreational marine engines sold in California. Therefore, any credits earned from the early introduction of cleaner engines in California would not be subject to double-counting under EPA's ABT program.

Letters:

Commenter	Document #
NMMA	0688
Mercury	0693
CARB	0682

Our Response:

With regard to the early credit provisions for SD/I engines, EPA is revising the program as a result of changes to the implementation dates for SD/I engines at or below 373 kW and changes to the emission standards for high-performance SD/I engines. As described in Section 3.2.2, EPA is delaying implementation of the new standards for SD/I engines at or below 373 kW until 2010 for most engines. This is a one year delay from the proposal and is in response to comments from manufacturers saying that additional lead time is needed to comply with the new standards. Because EPA has agreed that additional lead time is needed to comply with the new standards, we are revising the early credits provisions to allow manufacturers to earn early credits prior to 2010. However, given that manufacturers believe additional lead time is needed to comply, EPA does not believe that manufacturers should be able to earn bonus credits for certifying earlier than the 2010 timeframe. Therefore, EPA will allow manufacturers to earn early credits for SD/I engines below 373 kW that are certified before the applicable date in 2010 or 2011. However, manufacturers will not be eligible to earn bonus credits on those engines.

It should be noted that EPA is retaining a delayed implementation data of 2011 for small-volume engine manufacturers to comply with the new standards for SD/I engines at or below 373 kW, as proposed. Therefore, EPA is retaining the early credit provisions for small-volume engine manufacturers that certify earlier than 2011 to the new standards for SD/I engines at or below 373 kW, including the bonus factors that apply to the credit calculations. EPA believes it is appropriate to keep the bonus factors for small-volume engine manufacturers to encourage the early introduction of new technologies from those manufacturers. Early credits, alone, may not be enough incentives for small businesses to certify early to the standards because they may run the risk of losing market share, during these early years, to lower cost product from competitors who choose not to certify early. Bonus credits help provide an additional incentive for the early introduction of low emission engines.

EPA is retaining the requirement that engines must comply with both the HC+NOx standard and CO standard to qualify for early credits. The main purpose of the early credit program is to encourage the early introduction of engines complying with the new standards. EPA does not believe it is appropriate to provide credits for engines that comply with only one of the new standards, because that engine would not be a fully compliant product. In most cases, this should not be an issue because the anticipated emission-control technology for these engines may be used to meet both the new HC+NOx and CO standards.

As described earlier in Section 3.4.1, EPA is finalizing a set of emission standards for high performance SD/I engines that do not include ABT provisions. As a result, the early credits provisions for high-performance SD/I engines have been deleted from the final regulations.

In response to the comment on credits for engines sold in California, EPA is retaining the prohibition to generate credits from such engines, as proposed. SD/I engines sold in California are subject to exhaust emission standards adopted by CARB. EPA's new exhaust standards will not apply to SD/I engines sold in California. Therefore, it is not appropriate to allow manufacturer to earn credits for engines subject to CARB standards, even if California does not allow credits from those engines to be banked.

3.7 Other requirements

3.7.1 Diagnostics

What Commenters Said:

NMMA and Mercury Marine commented that the proposed rule includes a requirement in § 1045.110 that SD/I engines be equipped with an onboard diagnostic (OBD) system that will diagnose malfunctions of the emission control system. As proposed, § 1045.110(b) requires the OBD system to have a malfunction-indicator light (MIL) that must be readily visible. 72 Fed. Reg. at 28,265. The proposed regulatory text also states that the manufacturer "may use sound in addition to the light signal." Id. (emphasis added). NMMA and Mercury do not oppose the requirement for an OBD system on SD/I engines to the extent that the requirement is not overly complex and is consistent with the California requirements. On the automotive side, OBD systems that meet California requirements are deemed to comply with the federal requirements. The OBD requirements in Part 86 provide "For light-duty vehicles, light-duty trucks, and heavy-duty vehicles weighting 14,000 pounds GVWR or less, demonstration of compliance with California OBD II requirements (Title 13 California Code 1968.2 (13 CCR 1968.2)), as modified pursuant to CARB Mail-Out MSCD #02-11 (internet posting date October 7, 2002), shall satisfy the requirements of this section, except that compliance with 13 CCR 1968.2(e)(4.2.2)(C), pertaining to 0.02 inch evaporative leak detection, and 13 CCR 1968.2(d)(1.4), pertaining to tampering protection, are not required to satisfy the requirements of this section." 40 C.F.R. §

86.1806-05(j) (emphasis added). This “deemed to comply” provision has reduced the certification burden for the automotive industry and a similar approach is appropriate for the recreational marine industry.

NMMA and Mercury continued to comment while proposed § 1045.110(a)(3) seems to include the “deemed to comply” concept discussed above by allowing for a diagnostic system approved by CARB for use with SD/I engines to “fully satisfy the requirements of [§ 1045.110],” the requirement in that section for the MIL is inconsistent with the CARB regulations. In the CARB regulations, the OBD system must have “the capability to activate an audio or visual alert device located on the marine vessel to inform vessel occupants in the event of a malfunction . . . .” See CAL. CODE REGS. tit. 13, § 2444.2(b)(4) (2007) (emphasis added). EPA’s requirement of a MIL and possibly sound, if desired, is inconsistent with the CARB requirements and will impose an additional burden on manufacturers choosing the option of developing systems to meet both the California and future federal requirements. They recommend that § 1045.110(b) be revised as follows:

> (b) Use either a malfunction-indicator light (MIL) or sound. If a MIL is used, the MIL must be readily visible to the operator; it may be any color except red. When the MIL goes on, it must display ‘‘Check Engine,’’ ‘‘Service Engine Soon,’’ or a similar message that they approve. Instead of a MIL you may use sound. You may also use both a MIL and sound. In addition to the light signal. The MIL must go on or a sound must be made under each of these circumstances: 72 Fed. Reg. at 28,265.

Given that CARB’s OBD requirements for SD/I engines commence in model year 2008, it is critical that EPA harmonize the federal OBD requirements with those that are already in place in California. Subsections 1045.110(g)(1) and (2) also require revision. As currently proposed, these two subsections incorporate by reference two separate ISO standards: “ISO 9141-2 Road vehicles—Diagnostic systems—Part 2: CARB requirements for interchange of digital information, February 1994;” and “ISO 14230-4 Road Vehicles—Diagnostic systems—Keyword Protocol 2000—Part 4: Requirements for emission-related systems, June 2000.” 72 Fed. Reg. at 28,265. These standards are inappropriate for marine engines and should be replaced with a reference to an industry agreed to protocol developed by the American Boat and Yacht Council (ABYC).

Indmar commented that the final item Indmar Products believes needs clarification is the OBD-M system. CARB allows for a MIL or a sound device. They believe this option is necessary to stay common with CARB. This may appear to be a minor detail but would have significant cost and logistics impact if we have to develop and sell different OBD-M systems for EPA and CARB.

Volvo Penta opposes the use of ISO 9141-2 Road Vehicles and ISO 14230-4 Road Vehicles (1045.110g) for formats codes and connections. Volvo Penta has worked extensively with CARB, SAE and the other SD/I manufacturers to draft the new marine version of SAE J-1939 for marine onboard diagnostic purposes. Therefore, Volvo Penta supports and encourages the EPA to harmonize the OBD requirements with CARB. Two different systems of format codes and connections to provide one set of data is prohibitively expensive, overly burdensome and confusing to Volvo Penta and marine technicians in the field.

Yamaha commented that current PWC engines for Federal or California compliance do not require the addition of OBD currently or the near future. To add OBD both physically and electronically for a small percentage of engines will be challenging, time consuming and very costly due to small production quantities. These units are used in Yamaha produced Jet Boats exclusively. As this is a vertically integrated product, Yamaha requests exemption relief from unnecessary OBD requirements until a stand alone Jet Boat (SD/I) engine is produced and certified as a 5gr engine. Yamaha anticipates that this can be achieved by M/Y 2011.

Mercury Marine and NMMA commented that EPA states in § 1045.2, who is responsible for compliance, that [t]he requirements and prohibitions of this part apply to manufacturers of engines and fuel-system components as described in § 1045.1. The requirements of this part are generally addressed to manufacturers subject to this part's requirements. The term 'you' generally means the certifying manufacturer. For provisions related to exhaust emissions this generally means the engine manufacturer . . . . For provisions related to certification with respect to evaporative emissions, this generally means the manufacturer of fuel-system components. Vessel manufacturers must meet applicable requirements as described in § 1045.20. The difficulty with this provision is that the recreational marine industry is not vertically integrated. This means that the SD/I engine manufacturer will supply the engine, the OBD system, connectors and installation instructions to the boat builder but will have no further role in assuring compliance with the regulatory requirements. While § 1045.20 addresses the obligations of the boat builder, engine manufacturers cannot guarantee that these requirements will be followed. In particular, proposed § 1045.20(d) requires boat builders to "follow all emission-related installation instructions from the certifying manufacturers as described [in the rule]. If you do not follow the installation instructions, we may consider your vessel to be not covered by the certificates of conformity. Introduction of such vessels into U.S. commerce violates 40 CFR 1068.101." 72 Fed. Reg. at 28,262 (proposed § 1045.20(d)). While § 1045.20 makes it explicit that boat builders must comply with the regulatory requirements, neither § 1045.2 nor § 1045.20 provide a "safe harbor" for an engine manufacturer in the situations where the engine manufacturer complies with the regulations but the boat builder does not.

To remedy this situation, Mercury Marine and NMMA recommend that EPA include in the final rule additional language in § 1045.2 that would hold an engine manufacturer harmless in the event that a boat builder fails to follow the requirements of the rule. This provision should state that as long as the engine manufacturer applies the emission control label, the OBD system, connectors, and emission-related installation instructions, the manufacturer is deemed to be in compliance with the requirements of the rule. This additional language will avoid any future confusion as to the compliance obligations of the engine manufacturer.

NESCAUM commented that they support requiring engine diagnostics to ensure maintenance of stoichiometric control of air-to-fuel ratios.

Letters:

Commenter	Document #
NMMA	0688
NESCAUM	0641
Indmar	0667
Volvo Penta	0708
Yamaha	0721
Mercury	0693

Our Response:

The final diagnostic requirement focuses solely on maintaining stoichiometric control of air-fuel ratios. This kind of design detects problems such as broken oxygen sensors, leaking exhaust pipes, fuel deposits, and other things that require maintenance to keep the engine at the proper air-fuel ratio. California ARB has adopted diagnostic requirements for SD/I engines that involve a more extensive system for monitoring catalyst performance and other parameters. We will accept a California-approved system as meeting EPA requirements. The final regulations direct manufacturers to follow standard practices defined in documents adopted recently by the Society of Automotive Engineers in SAE J1939-5. We agree with commenters that the malfunction indicator may be either a visual or audible cue and have made the corresponding change in our final rule.

Jet boat engines that are certified using the emission-credit provisions of §1045.660 will not need a catalyst to meet emission standards. Because the proposed diagnostic requirements are geared toward closed-loop and catalyst-equipped engines, we agree that engines without these features should not need a diagnostic system. We have revised the regulation to apply the diagnostic requirement only to engines with catalysts. Jet-boat engines equipped with catalysts should be able to meet the proposed diagnostic requirements like any other SD/I engine.

As noted in the comment, the regulations clearly state that vessel manufacturers are in violation if they fail to properly install diagnostic systems or otherwise do not follow the certifying engine manufacturer's emission-related maintenance instructions. We believe the regulations do not need to go beyond this to create a safe harbor for engine manufacturers. Where an investigation establishes that the engine manufacturer has properly designed and produced an engine and communicated installation instructions to a vessel manufacturer, we would generally expect to enforce against the engine installer. On the other hand, there may be cases where the engine manufacturer has not properly designed or produced its engines or has not properly communicated installation instructions to vessel manufacturers (either by oversight or collusion). In these cases, we would not want to create an immunity for the engine manufacturer where we can in fact establish that the fault for misbuilt or otherwise noncompliant engines rests with the engine manufacturer.

3.7.2 Torque broadcasting

What Commenters Said:

Mercury Marine, NMMA and BRP commented that also related to the option for in-field testing is the requirement in proposed §1045.115(b), Torque Broadcasting, for electronically controlled engines to "broadcast" their speed and output shaft torque. 72 Fed. Reg. at 28,265. This section requires that engines "broadcast" engine parameters so that they can be read by a remote device or "broadcast" directly to controller area networks. The rationale provided in the proposed provision is that the information is necessary for testing in the field. Id. The term "broadcast" is also used in § 1045.205(s) in the provision related to the information required in the certification application. This term is not defined in the proposed regulations and it is unclear what this term means. They can only assume that "broadcast" is supposed to mean the transmission of a signal of some kind. EPA does not specify how far the signal must be sent, what form is acceptable, or what the design specifications are for the "receivers" for such broadcasts. Since the equipment does not exist, and there is no currently understood methodology to determine torque, given the nature of propeller cavitation and slip, Mercury Marine, NMMA, and BRP request that EPA delete this provision.

Volvo Penta opposes the need to broadcast engine torque. The proposal for manufacturers to broadcast engine torque is new, and has not been the subject of any discussion between EPA, NMMA and its member manufacturers. Volvo Penta has no experience with engine torque broadcast methods. Engine torque broadcast methodology is an emerging field without commonly accepted standards. Volvo Penta will require considerable time, resources and testing to create a robust and reliable method. If engine torque broadcast requirements are implemented through rulemaking, Volvo Penta will seek an exemption or postponement of implementation of the rule until after 2011.

Honda commented that they do not understand how these sections apply specifically to outboards and PWCs. They assume that EPA may have intended that some of these sections apply only to SDI vessels. Outboards and PWC do not necessarily include any sensors or controls in a basic 4-stroke carbureted engine so including them in this requirement, especially torque value broadcasting, would be a complete change in their configuration clearly not anticipated in either the regulatory implementation date nor in the cost analysis associated with the emission reductions. Without engine management, a simple air / fuel map of the engine in the operating range would be sufficient to demonstrate that the engine will provide proper emission performance and not introduce any form of "defeat device".

Letters:

Commenter	Document #
NMMA	0688
Honda	0705
Bombardier	0674
Volvo Penta	0708
Mercury	0693

Our Response:

As noted by Volvo, broadcasting for engines is an emerging field. For highway and nonroad diesel engines, we adopted requirements for engines to broadcast torque and speed values several years ago. We also adopted this requirement for Large SI engines in 2002. These systems are in the early stages of deployment, but there is a growing body of experience in this technology. Broadcasting simply involves electronic monitoring of engine parameters such that the engine's electronic control unit can record values as needed to determine engine speed and torque at any given point in time. This is useful for performing field tests with portable analyzers. Speed measurements are straightforward. Since torque cannot be easily measured directly, manufacturers would need to do enough testing in the laboratory to establish relationships between torque and other measurable parameters such as throttle position and manifold absolute pressure. Once those relationships are established, the electronic control unit can be programmed with a look-up table to convert measured values to torque readings in real time.

While we believe it is not difficult to incorporate broadcasting, we are aware that some development time is required to establish the look-up tables for converting engine operating parameters to torque values. We are also aware that the value of broadcasting for performing field tests with portable analyzers becomes prominent only after the point at which Not-to-Exceed standards have started to apply. We are therefore revising the regulation to require broadcasting starting with the 2013 model year.

We believe it is not necessary to establish protocols for codes or other details for broadcasting. Manufacturers should be able to establish their own protocols for their engines. This development will be in tandem with the manufacturers' effort to create diagnostic systems. In both cases there is a need for the electronic control unit to store values that can be retrieved by plugging in a laptop computer or some other type of reader. We expect the broadcast protocols to be based on those for the associated diagnostic systems. We are clarifying in the regulation that broadcasting needs to be done in a manner that allows for emission testing. For example, we believe it is not necessary to specify a frequency for broadcasting engine parameters, since testing can't be performed if the broadcasting is not frequent enough to perform a valid test under the procedures specified in part 1065.

We specifically object to Mercury's reference to propeller cavitation and slip as an obstacle to proper torque broadcasting. Engine torque is determined by the load that is applied to (and the rotational force that is transmitted through) the crankshaft. Any vessel-based variables such as vessel speed, vessel direction (upstream or downstream), vessel load, or propeller cavitation or slip would not affect the internal engine relationships between output torque and the relevant parameters such as throttle position and manifold absolute pressure.

We are limiting the broadcast requirements to electronically controlled engines. We agree that carbureted engines cannot be modified to comply with broadcasting requirements without fundamental modifications that go beyond the intended effect of setting new emission standards. However, we believe delaying the broadcast requirement until 2013 allows sufficient time for manufacturers to incorporate this upgrade for electronically controlled outboard and personal watercraft engines. As for SD/I engines, broadcasting will allow for greater flexibility in performing emission tests in the future.

3.7.3 Crankcase emission controls

What Commenters Said:

NESCAUM commented that they support EPA's proposal to require positive crankcase ventilation controls on SD/I engines.

Letters:

Commenter	Document #
NESCAUM	0641

Our Response:

We are adopting the crankcase requirements as proposed.

3.8 Certification

The following sections describe various issues related to the certification process that are specific to Marine SI engines. A few additional certification issues of more general interest are described in Section 1.3.

3.8.1 Maintenance

What Commenters Said:

Volvo Penta opposes the proposal that prohibits manufacturers from scheduling critical emission related maintenance during useful life. Testing to date shows that there may be need to replace O2 sensors before the useful life period of the engine is reached. The O2 sensor manufacturer has made recommendations as to the type of O2 sensors to be used, but stated that marine applications are different and harsher than other applications where these sensors have been used successfully. On-going sensor durability testing has revealed significant numbers of O2 sensors out of specification before the engine's useful life, as defined by the proposed rule. Moreover, our O2 sensor manufacturer has informed Volvo Penta that there is currently nothing available that will work any better in this application.

Letters:

Commenter	Document #
Volvo Penta	0708

Our Response:

There is no reason that oxygen sensors should fail before 480 hours of engine operation during service accumulation in the laboratory. We understand that in-use operating conditions may be so harsh that oxygen sensors will in some cases not survive through the useful life, but we believe that diagnostic systems are best suited to addressing this concern. A properly functioning diagnostic system would readily detect a failed oxygen sensor; the malfunction indicator would alert the operator. Since a failed oxygen sensor would lead to a loss in available power or increased fuel consumption or both, we believe owners would generally respond to the malfunction indicator by replacing the defective component.

3.8.2 Carryover data

What Commenters Said:

BRP supports NMMA proposal to have carry-over engine families from the existing marine regulation and early-certified engine families meeting the exhaust emission standards of the proposed regulation be exempt from the proposed NTE test requirements and maximum test speed definition change through MY2013. It is necessary for BRP to phase in engine families to the new testing requirements over the next few model years. It is infeasible to re-test every engine family within the next couple years to verify compliance with the NTE proposal. In addition, allowing carry-over data to be exempt from the NTE and maximum test speed provisions will create an incentive for BRP and other manufacturers to certify their engine families to the new emissions standards in an earlier model year.

Letters:

Commenter	Document #
Bombardier	0674

Our Response:

BRP's comments generally affirmed the rule as proposed. We have included these provisions in the final rule.

3.8.3 Warranty

What Commenters Said:

NMMA and Mercury Marine commented that EPA notes in the preamble that the Agency is proposing updated warranty periods for the new standards. 72 Fed. Reg. 28,132. The new proposed emission-related warranty periods for PWC and OB engines in § 1045.120 are shorter in terms of hours but longer in terms of calendar years (or months). 72 Fed. Reg. at 28,132. For OB engines, EPA is proposing 5 years or 175 hours of operation, whichever comes first. 72 Fed. Reg. at 28,132. For PWC engines, EPA proposes 30 months or 175 hours, whichever comes first. The new warranty provision also requires that an emission related warranty cannot be any shorter than any published warranty offered without charge for an engine or component. 72 Fed. Reg. 28,266 (proposed § 1045.120(b)). NMMA does not oppose the updated warranty periods for these engines nor does NMMA object to the requirement for the warranty period to track with any free, published warranty; however, § 1045.120(b) should be revised to clarify that "any published warranty" only applies to the particular engine and not the entire engine family. In addition, NMMA commented that EP A also needs to clarify that "any published warranty" does not include service contracts. Service contracts are those contracts that manufacturers offer for maintaining and repairing the engine beyond the warranty period. NMMA commented that while most service contracts require a fee, in some cases manufacturers may, as a promotion, offer complimentary service contracts for a limited period of time to encourage the purchase of a new product or to clear inventory. A service contract, however, is not a warranty and should not be construed as such.

To make the language clear, NMMA recommends that EPA revise § 1045.120(b) as follows:

> (b) Warranty period. Your emission-related warranty must be valid during the periods specified in this paragraph (b). You may offer an emission related warranty more generous than we require. The emission-related warranty for the engine may not be shorter than any published warranty you offer without charge for the engine and would only apply to the engine and not the engine family. Similarly, the emission-related warranty for any component may not be shorter than any published warranty you offer without charge for that component. A service contract is not a warranty. If an engine has no hour meter, we base the warranty periods in this paragraph (b) only on the engine's age (in years). The warranty period begins when the engine is placed into service. These changes will help clarify that only the engine and not the engine family is affected by any published warranty and that service contracts are not to be confused with warranties.

Letters:

Commenter	Document #
NMMA	0688
Mercury	0693

Our Response:

We agree that extended warranties offered at no additional charge should be limited to those components or engines that are the subject of the extended warranty. We have revised the regulation to emphasize that the extended warranty does not apply more broadly than for the particular engines that are the subject of the extended warranty. We believe it is not helpful to introduce a distinction between no-cost service contracts and warranties because that would likely become a loophole that allows manufacturers to avoid warranty requirements. In particular, if a manufacturer offers a no-cost service contract, that represents an expectation that the engine will operate consistently over a certain period. We do not understand or accept the logical construct that would say the engine manufacturer should pay for defects that are not emission-related, but that they are not responsible for defects that are emission-related. We are therefore adopting these warranty requirements as proposed.

3.8.4 Family criteria

What Commenters Said:

NMMA and Mercury commented that for SD/I certification purposes, EPA is proposing in § 1045.230(b) to require manufacturers to group engines in the same family if they are the same in all the following respects: combustion cycle and fuel; cooling system (e.g., raw water, separate circuit cooling); method of air aspiration; number, location, volume and composition of catalytic converters; the number arrangement, and approximate bore diameter of cylinders;

method of control for engine operation; numerical level of the emission standards that apply to the engine. 72 Fed. Reg. 28,271. While this list is very similar to what is currently required for outboard and personal watercraft in § 91.115, the SD/I engine segment has unique characteristics and requires a more flexible approach that will prevent the creation of a large number of engine families and reduce the certification and administrative burdens placed on these manufacturers (e.g., double certification tests, durability tests, recordkeeping, etc.). To that end, in the final rule, NMMA and Mercury comment that EPA should revise §1045.230(b) to reduce the number of characteristics that must be identical for purposes of determining engine families.

In particular, NMMA and Mercury stated that the requirements for identical cooling systems and bore diameter should be removed because these are overly restrictive in practical effect and will not have an impact on exhaust emissions from SD/I engines. Exhaust emissions do not vary for thermostatically controlled engines regardless of whether the engine is cooled with raw or fresh water. Also of significance is that CARB does not require manufacturers to use the cooling system as a criterion for distinguishing among engine families. NMMA and Mercury commented as for the bore diameter, there are situations where similar engines of varying displacements should be included in the same engine family. For example, GM's 5.0L and 5.7L engines vary only in displacement and share common induction systems, number and arrangement of cylinders, cylinder heads, and external marinization components, including exhaust equipped catalysts. These engines have been classified historically in one engine family and have the same emissions characteristics. For these reasons, NMMA and Mercury believe that EPA must delete these criteria for SD/I engines from § 1045.230(b).

NMMA and Mercury Marine commented for PWC/OB, EPA proposes requirements for dividing product lines into engine families in § 1045.230. As discussed in the comments related to the requirements for SD/I engines, the list of characteristics contained in proposed § 1045.230(b) is similar to what is in § 91.115; however, there are several requirements, e.g., the bore diameter and cooling systems, that will require SD/I manufacturers to establish too many engine families as noted above and are not a meaningful criteria for PWC or OB engines either. There are also several differences between § 1045.230(b) and § 91.115 with regard to the inclusion of the numerical level of the emissions standards and method of control for engine operation in the characteristics that must be identical. 72 Fed. Reg. 28,271 (proposed § 1045.230(b)(6) and (7)). In light of these differences and the fact that OB and PWC engine manufacturers have been following § 91.115 for over a decade, NMMA and Mercury Marine recommend that EPA substitute portions of § 91.115(c) and (d) for the corresponding language in § 1045.230 with the changes recommended for SD/I. The following redline is provided by NMMA and Mercury to show how this provision should be revised.

§ 1045.230 How do I select engine families?

a. For purposes of certification, divide your product line into families of engines that are expected to have similar emission characteristics throughout the useful life as described in this section. Your engine family is limited to a single model year.
b. To be classed in the same engine family, engines must be identical in all of the following applicable respects:
   (1) The combustion cycle;
   (2) The cylinder configuration (inline, vee, opposed, and so forth);
   (3) The number of cylinders;
   (4) The number of catalytic converters, location; volume, and composition; and
   (5) The thermal reactor characteristics.

Group engines in the same engine family if they are the same in all the following aspects:
(1) The combustion cycle and fuel.
(2) The cooling system (for example, raw-water vs. separate-circuit cooling).
(3) Method of air aspiration (for example, turbocharged vs. naturally aspirated).
(4) The number, location, volume, and composition of catalytic converters.
(5) The number, arrangement, and approximate bore diameter of cylinders.
(6) Method of control for engine operation, other than governing (i.e., mechanical or electronic).
(7) The numerical level of the emission standards that apply to the engine.

c. At the manufacturer's request, engines identical in all the respects listed in paragraph (b) of this section may be further divided into different engine families if the Administrator determines that they may be expected to have different emission characteristics. This determination is based upon the consideration of features such as:
(1) The bore and stroke;
(2) The combustion chamber configuration;
(3) The intake and exhaust timing method of actuation (poppet valve, reed valve, rotary valve, and so forth);
(4) The intake and exhaust valve or port sizes, as applicable;
(5) The fuel system;
(6) The exhaust system; and
(7) The method of air aspiration.

You may subdivide a group of engines that is identical under paragraph (b) of this section into different engine families if you show the expected emission characteristics are different during the useful life.

d. You may group engines that are not identical with respect to the things listed in paragraph (b) of this section in the same engine family, as follows:
(1) In unusual circumstances, you may group such engines in the same engine family if you show that their emission characteristics during the useful life will be similar.
(2) If you are a small-volume engine manufacturer, you may group all your high-performance engines into a single engine family.
(3) The provisions of this paragraph (ed) do not exempt any engines from meeting all the emission standards and requirements in subpart B of this part.

NMMA commented that these recommended revisions harmonize the existing requirements in § 91.115 with the newly proposed § 1045.230. This redline also reflects the recommendations discussed above related to SD/I engine families.

Honda commented regarding the Engine Family Determination for Outboard Engines and PWCs. Honda suggests that the criteria for engine family selection outlined in Section 1045.230(7) of the proposal be deleted from the final rule. Section 1045.230 of the proposal makes "the numerical level of the emission standard" a family determination criteria. The numerical standard level would mean that each engine horsepower would be a separate family. This is unlike 40 CFR Part 91 where two engine models (75 & 90 hp for example) are created from one engine (same displacement / block and head) and are in the same family. This change would be completely contrary to the intended purpose of the family concept (similar engine with similar emission characteristics). Perhaps this was incorrectly carried over from another regulation where different classes with different displacement categories meet numerically different standards.

Indmar commented in §1045.230 (b) 2 the cooling system (raw-water vs. separate-circuit cooling) could be a family discriminator. This would double the number of engine families for them with no value added. Indmar offers most of their engines with raw-water or fresh-water cooling. The control temperature for both these applications is 165 degrees Fahrenheit. The exhaust manifolds are heated for both fresh and raw water systems so the exhaust gas feed stream to the catalyst is not impacted differently with either system. The emissions of the engine will not change with either cooling system. Also of significance is that CARB does not require manufacturers to use the cooling system as a criterion for distinguishing among engine families.

Suzuki commented that EPA has proposed to revise the requirements for how to group products into common engine families to include a new provision of "approximate bore diameter" as a requirement for engine family grouping. Suzuki is concerned that this new provision will inappropriately require the creation of additional engines families that otherwise could be grouped together if the existing engine family grouping criteria specified in §91 .115 were employed. They are also concerned that the judgment criteria could be confusing to implement from a certification-planning viewpoint. Suzuki requests that EPA reconsider the need to include this revision in the regulation. Should EPA decide to proceed with the proposed revision, Suzuki requests that the regulatory language be revised to allow the Agency to have discretion to approve the grouping of engines of dissimilar bore diameters if a manufacturer can show that the proposed grouping is in agreement with good engineering practices.

Volvo Penta opposes the family aspects (families) as outlined in the NPRM. Volvo Penta commented that the proposed NPRM aspects will create too many engine families requiring a multiplicity of certification testing and documentation with no resulting emissions reduction. The proposal, therefore, is unnecessarily burdensome. Volvo Penta is a custom marinizer of General Motors (GM) produced engine blocks. Traditionally, Volvo Penta arranged engine families for emissions classification by GM's engine block types and fuel intake systems. As the engines are catalyzed, the fuel intake systems become the same, thereby eliminating fuel intake type as a family discriminator. Volvo Penta's current engine families for emissions purposes are:

- 3.0 I4 Carbureted
- 4.3 V6 Carbureted
- 4.3 V6 EFI
- 5.0 V8 Carbureted
- 5.0 V8 EFI
- 5.7 V8 EFI (All models EFI)
- 8.1 V8 EFI (All models EFI)

Beginning with California in 2008 Volvo Penta will identify the following engine families:

- 3.0 I4 (EFI + Cat)
- 4.3 V6 (Carbureted)
- 4.3 V6 (EFI)
- 5.0 & 5.7 V8 (all models EFI + Cat)
- 8.1 (all models EFI + Cat)

They anticipate that by 2011 the Volvo Penta engine families will include:

- 3.0 I4 (EFI + Cat)
- 4.1 V6 (all models EFI + Cat)
- 5.0 & 5.7 V8 (all models EFI + Cat)
- 6.0 SC V8 (all models EFI + Cat)

Volvo Penta will continue to offer multiple horsepower and cooling system options within each family as they do today. The least compliant (i.e., “dirtiest”) engine within each family is used for California and EU compliance certification purposes. That process ensures that all engines within a particular family (however defined) meet the emissions criteria required. Multiple families add expense without benefit.

Pleasurecraft Marine in a hearing commented that §1045.230 outlines the criteria for defining engine families. There are two areas that Pleasurecraft Marine commented need reconsideration. Those areas are:

- Line Item 2, the cooling system (§1045.230(b)(2)
- Line Item 5, the number, location, volume, and approximate bore diameter of the cylinders (§1045.230 (b)(5)).

Pleasurecraft Marine commented regarding Line Item 2, segregating engine families by their cooling system accomplishes nothing more than doubling the number of engine families. Emissions will not vary, for thermostatically controlled engines regardless of whether the engine is raw or fresh water-cooled, therefore, the cooling system should not be a factor in determining engine families.

Pleasurecraft Marine commented regarding Line Item 5, there are circumstances where similar engines of different displacements should be included in a common engine family. An example would be the General Motors 5.0 and 5.7 liter engines. These engines vary only in displacement and share common induction systems, number and arrangement of cylinders, cylinder heads, and external marinization components including exhaust equipped with catalyst. Historically General Motors, who designed these engines, has classified them as one family. If the larger displacement 5.7L will meet emissions standards it is safe to say that the 5.OL will do so as well. Classifying these engines as one family, as they should be, will save small businesses, such as theirs, tens of thousands of dollars in unnecessary certification cost.

Letters:

Commenter	Document #
NMMA	0688
NMMA	0688
Honda	0705
Indmar	0667
Volvo Penta	0708
Mercury	0693
Pleasurecraft Marine (hearing)	0642

Our Response:

We agree that engine families should not be differentiated based on the cooling system. The current regulations in part 91 include this specification, but it seems that the relative uniformity of designs for outboard and personal watercraft engines has prevented this from being an issue. We are revising the regulations to exclude the cooling system from §1045.230 for all Marine SI engines.

The intended effect of including the applicable emission standard to differentiate engine families was two-fold. First, this would prevent SD/I engines from being included in the same engine family with OB/PWC engines. Second, this would prevent engines certified to different Family Emission Limits from being in the same engine family. Selecting different Family Emission Limits for engines that are subject to identical standards inherently implies that the engines will not have similar emission characteristics throughout the useful life, which is the fundamental purpose of establishing engine families, as expressed in §1045.230(a). Contrary to the concern raised by Honda, the regulatory language does not prevent a manufacturer from including different power ratings in the same engine family. As specified in §1045.103, the applicable emission standard for an OB/PWC engine family is based on the maximum engine power for the engine family as described in §1045.140. Section §1045.140 acknowledges that an engine family may have multiple power ratings within the family by specifying that the maximum engine power for an engine family is the production-weighted average of each engine configuration within the engine family. Therefore, under the regulations for OB/PWC engines in part 1045, manufacturers will be able to include different power ratings in a given engine family just as they currently can do under the part 91 regulations.

We believe the regulation should require that engines in a single family have the same "approximate bore diameter." This lays out the general expectation that engines with substantially different displacement values cannot be assumed to have the same emission characteristics throughout the useful life. Basing family differentiation on approximate bore diameter also allows us the flexibility of including engine models in the same family if the difference in displacement is not so great. We have traditionally applied this principle by allowing combined families where the smaller engine has a displacement that is within 15 percent of the displacement of the larger engine. This would, for example, allow the 5.0 and 5.7 liter engines to be grouped into the same engine family. We would have the discretion to broaden this threshold if a manufacturer could demonstrate that two engine models would have similar emission characteristics throughout the useful life. Conversely, we would be able to narrow this threshold if necessary to prevent inappropriate groupings of engines.

3.9 Test procedures

3.9.1 Maximum test speed

What Commenters Said:

NMMA commented that EPA proposes a definition for "maximum test speed" as the "single point on an engine's maximum-power versus speed curve that lies farthest away from the zero-power, zero-speed point on a normalized maximum-power versus speed plot." 72 Fed. Reg. at 28,133. EPA claims that the definition for maximum test speed establishes objective procedures for determining this parameter. NMMA's concern with the proposed definition is that it fails to incorporate the SAE J1228 and the ISO 8665 standards that are currently used by industry. In addition, the new term would have the effect of overly complicating testing and certification. First, it will result in having to run different tests and data points for EPA, CARB and the EU. Second, it is important to note that the power curve is different for engines with different horsepower within an engine family. Thus, a manufacturer would have to run all these different power curves, determine the test points for each engine model in the engine family, run an emissions test on each with unique test points to determine which is the highest emitting engine, and then certify that engine. Finally, another consideration is that manufacturers use, as the Mode 1 point, the speed at which the boat should be "propped." For these reasons, NMMA recommends that EPA use the current certification method of rated speed and rated power in the final rule.

Mercury Marine commented that EPA proposes a definition for "maximum test speed" as the "single point on an engine's maximum-power versus speed curve that lies farthest away from the zero-power, zero-speed point on a normalized maximum-power versus speed plot." 72 Fed. Reg. at 28,133. EPA claims that the definition for maximum test speed establishes objective procedures for determining this parameter. Mercury Marine's concern with the proposed definition is that it fails to incorporate SAE 1228 and ISO 8665 standards that are currently used by industry, which calls for using the midpoint of the maximum rpm range. This will mean that an EPA certification will no longer be the same as CARB's or the EU's. This is a major move away from harmonization of standards and will generate extra cost and work for no appreciable gain. In addition, on some engines, this will move the Mode 1 point to the maximum allowable rpm for the engine. Boat builder and customer practice is to prop the boat at the midpoint. Therefore, this makes the test less representative of real world operation. Propping the boat at the maximum allowable rpm would create a situation, under some operating conditions, where the engine would over-rev and bounce on and off of the rev limiter, which is set just slightly above the maximum allowable rpm.

Mercury Marine submitted an email stating that they are having great difficulty understanding the Max Test Speed Issue. The attached normalized speed and power graph are for the 75-90-115 Hp Optimax (DI 2 stroke). The engine has a maximum operating speed range of 5000 - 5750 rpm. If they are understanding this correctly, they would have to use 5750 rpm as the Mode 1 point for the 90 and 115. Is that correct? (Not sure about what point they use for the 75.) If so, they would be testing the engine in a way that no boatbuilder would ever prop it to, and no owner would ever use it that way. Their instructions are to prop the boat to the midpoint of the range and virtually everyone does that. To prop it to run 5750 rpm, you would have a situation where you could potentially be bouncing off the rev. limiter at WOT (it is set at 5850 rpm). (data and graph also added- see package).

Bombardier commented that EPA proposes a definition for "maximum test speed" as the "single point on an engine's maximum-power versus speed curve that lies farthest away from the zero-power, zero-speed point on a normalized maximum-power versus speed plot." EPA claims that the definition for maximum test speed establishes objective procedures for determining this parameter. BRP is concerned the proposed definition change fails to align with the SAE J1228 and the ISO 8665 standards that are currently used by industry.

BRP outboard engines are 'propped' around the wide open throttle point on the ICOMIA test cycle. This point optimizes the engine performance, and all boat builders are instructed to prop the engine within an RPM range of this test point. Since this point offers the greatest engine performance and flexibility, propping a boat outside of the recommended RPM range can void the warranty. Consequently boat builders will insure the engine is propped within the recommended RPM range. By changing the definition of maximum test speed, EPA will be changing the wide open throttle point for many engine technologies. Since this point is utilized to calculate the other test points along the ICOMIA cycle, this will force a manufacturer to certify an outboard engine family using test points which will not represent the emissions of an in-use engine.

BRP continued that in addition, the new definition would force a manufacturer to run an additional power curve test prior to conducting any emission test to determine the applicable test points. This would have the effect of overly complicating testing and certification. The proposed maximum test speed definition change will result in having to run different tests and data points for EPA, CARB and the EU which increases a manufacturer's test burden and costs. For these reasons, BRP recommends that EPA maintain the current certification method of rated speed and rated power.

Volvo Penta disagrees with the need to establish a Maximum Test Speed. In reality, the proposed test is contrary to the EPA's stated goal of corresponding in use operation. Rated speed is determined by the point that that the engine makes maximum power. Most if not all manufacturers have a recommended engine speed range that typically is a band of about 400 RPM. The boat manufacturers will select the appropriate propeller to meet the midpoint of the RPM band (rated speed) which is the max boat speed point with a normal boat load. The boat may run 200 RPM higher with a light boat load but the boat speed will not necessarily be greater. With a heavy load, the boat will run 200 RPM lower and will lose some speed. Most engine manufacturers set RPM limiters approximately 100 RPM above the upper end value of the range to prevent engine damage due to over-trimming or propeller ventilation.

Suzuki commented that EPA is proposing to revise the definition of "maximum test speed" as the "single point on an engine's maximum-power versus speed curve that lies farthest away from the zero-power, zero speed point on a normalized maximum-power versus speed plot." This definition would deviate from currently accepted industry practice used in the US and internationally, which is to follow standards defined by SAE J1228 and ISO 8665.

Suzuki believes EPA's proposed revision is unnecessary and could require the creation of Federal specific test data points, with a separate set of test points for engines certified for in California and international markets . They request that EPA reconsider their proposed revision, and adopt the currently acceptable standards set by SAE J1228 and ISO 8665.

Letters:

Commenter	Document #
NMMA	0688
Bombardier	0674
Mercury Marine	0717
Volvo Penta	0708
Mercury	0693
Suzuki	0698

Our Response:

The manufacturers express their interest in continuing to determine maximum test speed as specified in the current regulations and the relevant SAE and ISO standards. However, this is misleading, since the requirement under all these testing protocols is for manufacturers to declare the maximum test speed of an engine based on its rated power, without providing any objective criteria for establishing the point of rated power. We believe manufacturers generally choose a maximum test speed that is consistent with the way engines operate in use, but under the current program we would have little or no ability to insist that an engine's maximum test speed and rated power point be reasonably representative of an in-use configuration.

The importance for adopting objective criteria for selecting maximum test speed grows significantly with Not-to-Exceed standards. The upper end of the NTE zone is based on maximum test speed, so manufacturers would have a significant incentive to declare a maximum test speed as low as possible. It is very common for engine manufacturers to specify a prop range of 1000 rpm. This shows that there is considerable latitude in fitting propellers that would result in a wide range of expected speed and power values. Allowing manufacturers to declare lower values for maximum test speed would shift the whole NTE zone toward lower speeds, potentially causing large areas of common engine operation under the engine map to be "out of bounds" for testing.

The proposed approach from part 1065 is used for a wide range of engine categories to reliably locate maximum test speed at a point on the engine map such to maximize available power over a range of operating speeds. The current regulations specify that the value selected for maximum test speed must be within 2.5 percent of the calculated value. For Marine SI engines operating up to about 6000 rpm, this translates to a range of ±150 rpm. For many engines that are not used for marine propulsion, the calculated value of maximum test speed is the midpoint of a range of values the manufacturer could select for governing off of the power map. However, as noted in the comments, Marine SI engines need to be fitted with a propeller such that the nominal value for achieving maximum power needs to be away from the point at which the governor (or rev limiter) starts to cut engine power. We therefore believe it is appropriate to specify for Marine SI engines that the declared value for maximum test speed may be within 500 rpm of the calculated value. For example, if maximum test speed is calculated to be 6000 rpm based on an engine's power map, the manufacturer could declare a maximum test speed as low as 5500 rpm. Based on a range of power maps shared confidentially by multiple manufacturers, this approach would allow manufacturers in most or all cases to select a maximum test at the maximum power point or at the midpoint of the specified prop range.

In addition, we are adding a provision to the regulations to specify that the maximum speed of the NTE zone for in-field testing is based on the engine's actual maximum operating speed. As long as the engine is installed consistent with the engine manufacturer's instructions regarding prop specifications, we would be able to perform valid tests throughout the NTE zone based on the engine's actual maximum operating speed. This would address our concern that many owners and boat builders may not be so careful to install a propeller that targets the midpoint of the speed range specified by the manufacturer. This approach allows manufacturers to design for the nominal value (and probably the most common in-use configuration) for certification without overlooking the range of in-use experiences.

If boat builders or owners install a propeller outside of the engine manufacturer's specified range, we would consider these engines to be "not properly maintained and used", which would make them ineligible for compliance testing in that configuration. Note that we would generally consider boat builders to be guilty of violating the tampering prohibition if they do not follow the engine manufacturer's specifications for propellers. If we wanted to test an engine and found that the propeller was outside of the manufacturer's specifications, we would arrange for replacing the propeller to be within the manufacturer's specified range. Similarly, if the propeller were worn or damaged such that the engine no longer operated within the manufacturer's specifications, we would replace the propeller before testing. We would also not consider a test to be valid if the vessel's characteristics had changed such that the engine no longer operated within the manufacturer's specifications (such as through wear, modification, or lack of cleaning).

We would expect manufacturers to declare this same value for maximum test speed for testing to demonstrate compliance with California or European standards, so we are not adopting a provision that would cause a need for duplicate testing for non-harmonized programs. It is true that manufacturers would need to run an engine map for each engine, but we expect that this is already common practice to establish the engine's power characteristics and determine the recommended prop range. Manufacturers may continue to use engineering judgment to establish the worst-case configuration in an engine family for selecting a test engine, as is done today.

3.9.2 Field-testing procedures

What Commenters Said:

NMMA and Mercury Marine commented that EPA proposes in § 1045.401(a) and § 1045.410(f)(2) in-use testing provisions to allow optional field testing instead of laboratory testing. This same option also is included in the provisions for certification testing in § 1045.515. As noted earlier in their comments above on the optional field-testing for SD/I engines, this option does not provide additional flexibility for PWC and OB engine manufacturers because it has no meaningful impact. The equipment needed to conduct field testing does not exist and there are no standardized requirements for ports in which to plug the devices. NMMA and Mercury recommend that EPA delete the references to field testing until such equipment is commercially available and has proven to be accurate and consistent.

Bombardier commented that EPA proposes in 40 CFR 1045.401(a) and 40 CFR 1045.410(f)(2) of the in-use testing provisions to allow optional field testing instead of laboratory testing. This same option also is included in the provisions for certification testing in 40 CFR 1045.515. The equipment needed to conduct field testing does not exist and there are no standardized requirements for ports in which to plug the devices.

Bombardier continued as discussed in the NMMA comments, adopting the field testing requirements of 40 CFR 1065 is not technically feasible for the marine industry. The equipment necessary to conduct accurate measurements has not been verified for use in marine products. BRP is concerned that less accurate field sampling equipment could be used to determine if an engine is in compliance with the proposed emission requirements. BRP believes any emission testing needs to be performed utilizing the test procedures and equipment required for certification.

BRP recommends that EPA delete the references to field testing until such equipment is commercially available and has proven to be accurate and consistent.

Volvo Penta opposes any alternate field test procedures. Volvo Penta has not undergone experience with, or consideration of, such procedures. Volvo Penta does not understand the purpose for this proposal. If the intention is to be able to measure emissions from a given engine, then we feel that the proposal is fraught with potential problems. Circumstances such as, varying exhaust back pressure changing engine loads (due to wind, current and tides), unknown fuel properties, and variation in portable analyzers can have an effect on the results. Moreover, the engine OBD effectively captures the emissions history for an engine without the need for additional testing procedures or methodology.

Letters:

Commenter	Document #
NMMA	0688
Bombardier	0674
Volvo Penta	0708
Mercury	0693

Our Response:

Equipment is available today for measuring emissions from engines while they remain installed in a marine application. We believe it is important to be able to make these measurements and are adopting provisions broadly across our programs to allow for this. These measurements allow us to most effectively characterize the true emissions performance from in-use engines. Also, in the case of personal watercraft, manufacturers may be able to realize substantial savings by performing their required in-use testing using field-testing procedures so they don't have to destroy the vessel to remove the engine for testing.

Part 1065 describes the accuracy requirements for the portable analyzers associated with field-testing procedures. The requirements generally allow for somewhat less accuracy and precision. We understand that commercial fuels may also differ somewhat from certification fuels in a way that could affect emissions. We also agree that wind, current, and other factors can change the way the engine operates; this is fundamental to the NTE approach in which we require manufacturers to design for engine operation away from the discrete test modes for certification. We are not aware of the affect that tides have on engine operation. In any case, we are adopting NTE multipliers that take into account all these factors for potentially higher or more variable emissions associated with field-testing measurements. Manufacturers may choose to perform tests with portable analyzers at certification to establish a correlation with conventional laboratory measurements.

Diagnostic systems are helpful for detecting defects and the need for engine maintenance. They are not effective for evaluating the performance or effectiveness of properly functioning engines. Measuring emissions from in-use engines is the best way to establish whether certified engines are achieving the intended level of reduced emissions.

We believe it is not necessary to specify a standardized access port for routing exhaust emissions to a portable analyzer. It should not be difficult to mate a range of access ports to a given analyzer with any necessary fittings. Also, over time we believe manufacturers will be able to communicate and cooperate as needed to establish a single protocol, or at least a small number of protocols, for mating analyzers with exhaust ports.

3.9.3 1065 issues for Marine

What Commenters Said:

Honda also recommends a review of the change in test procedure to determine if there is any measurement improvement or emission benefit that warrants the cost of the equipment upgrade that may be necessary to make these measurements according to Part 1065.

Letters:

Commenter	Document #
Honda	0705

Our Response:

As described in Section 2.5, we believe the test procedures specified in part 1065 have been reviewed very carefully to reflect a consensus regarding appropriate equipment specifications, calibrations, and procedures. Many manufacturers testing under part 91 today will have to make little or no change to meet the part 1065 requirements. Some manufacturers may find that they need to upgrade a measurement instrument or incorporate some changes to their current practice. We have included an estimate of the cost of making these changes in the Final Regulatory Impact Analysis.

3.9.4 Humidity correction

What Commenters Said:

Mercury Marine commented that the current rule allows for NOx correction for humidity, as it does for California. Therefore, they have not needed humidity control in their test cells. It appears that this provision has been eliminated in the proposed rule. This will require Mercury to add humidity controls to their test cells, at great expense. They therefore request that NOx correction for humidity be included in this rule.

Letters:

Commenter	Document #
Mercury	0693

Our Response:

We agree that the humidity corrections specified in part 1065 should be available for Marine SI engines. We have revised the regulations in part 1045 to specifically allow this.

3.10 Production-line testing

3.10.1 Need for PLT for SD/I engines

What Commenters Said:

NMMA commented that EPA, however, is proposing to require production line testing (PLT) for SD/I engines in § 1045.301. NMMA urges EPA to reconsider requiring SD/I engine manufacturers to perform PLT. The CARB regulations do not impose PLT requirements on SD/I engine manufacturers. It is critical for this industry that EPA makes the federal and California programs as seamless as possible to eliminate the additional burden and cost caused by inconsistent regulatory requirements. It is also important to note that above and beyond the actual costs of the tests themselves, the cost of an emissions bench assuming one is even available) and a dynamometer can average around $500,000. Furthermore, there are significant “brick and mortar” costs associated with the proposed PLT requirements that EPA’s proposal fails to take into account. It is our understanding that NMMA members will provide in their separate comments additional detail on the extensive costs that will be imposed by the proposed PLT requirements.

NMMA continued that in addition, as noted above, the requirement to install an OBD system as specified in § 1045.110 will ensure that an owner is notified in the field of any problem with the emission control system. To that end, NMMA recommends that EPA insert a third provision in § 1045.301(a) as follows:

> **§ 1045.301 When must I test my production-line engines?**
> (a) If you produce engines that are subject to the requirements of this part, you must test them as described in this subpart, except as follows:
>
> > (1) Small-volume engine manufacturers may omit testing under this subpart.
> > (2) You may exempt engine families with a projected U.S.-directed production volume below 150 units from routine testing under this subpart. Request this exemption in the application for certification and include your basis for projecting a production volume below 150 units. You must promptly notify us if your actual production exceeds 150 units during the model year. If you exceed the production limit or if there is evidence of a nonconformity, we may require you to test production- line 12 engines under this subpart, or under 40 CFR part 1068, subpart E, even if we have approved an exemption under this paragraph (a)(2).

(3) Engines equipped with an on-board diagnostic system meeting the requirements in § 1045.110 of this subpart are exempt from the requirements of this section.

NMMA continued to comment that this additional language should be included in the rule to reduce the regulatory burden imposed on engine manufacturers by the rule.

Mercury Marine urges EPA to reconsider requiring SD/I engine manufacturers to perform PLT. The CARB regulations do not impose PLT requirements on SD/I engine manufacturers. It is critical for this industry that EPA makes the Federal and California programs as seamless as possible to eliminate the additional burden caused by inconsistent regulatory requirements.

To implement PLT, Mercury Marine would need to add one, or more, new emissions test cells, including instrumentation benches, and dynamometers. The equipment costs alone are in the $600,000 range, and building the facilities, including climate control, air handling, etc. could easily equal that figure. Therefore, they are looking at over $1M per test cell. Further, there will be impacts on plant emissions and permitting that will further drive up costs. If an engine was built incorrectly, the OBD system would detect the problem, so there is no emissions benefit to this extremely costly requirement.

Indmar commented that they would like to see End of Line testing not required for all SD/I engines. The OBDM system implemented for SD/I engines will catch and identify any engine operating problem that might result in non emission compliant engines. All emission components as well as the operation of the catalytic converter are monitored. Any engine with a problem will be caught at end of line run check and corrected before the engine is sold to commerce. This procedure would be common with CARB.

Volvo Penta opposes production line testing (PLT) for SD/I engines.

- All SD/I engines (except Hi-Performance) will be equipped with catalytic converters with feed back loop controls with on-board diagnostics (OBD) that constantly monitor the emission control systems of these engines as they run. In the event of an emission system malfunction, OBD will notify the operator of the malfunction and will log the event electronically. This electronic record is available after the event.
- Volvo Penta starts and runs each engine at the factory as a final quality control step. It can maintain OBD data for a reasonable period of time on each engine to prove compliance at the factory.
- PLT testing for SD/I is economically burdensome for no added benefit because information it provides is duplicative of the data collected in the OBD system. The capital investment cost to add the PLT equipment to Volvo Penta's production facility is over $**CBI**. This capital investment adds an annual financial burden of $__**CBI**____to $__**CBI**_____ for in- plant testing that will translate directly into increased costs for the consumers. In addition, the time to install the necessary equipment in the plant is approximately 18-24 months. This means that it is highly unlikely that Volvo Penta would be able to comply with a mandatory PLT rule unless the implementation is pushed back until 2 years after the final rule takes effect.

- Finally, Volvo Penta asks that the EPA be required to supply justification for this requirement especially after EPA staff concurred in a public forum that if OBD was added to the rule.

Pleasurecraft Marine commented in a hearing that Section 1045.301 outlines the method for testing production line engines. Pleasurecraft would like to see the elimination of this requirement since the On Board Diagnostic system will detect any malfunctions or abnormalities and will prevent the engine from being introduced into commerce until proper corrections are implemented. Additionally this process will harmonize with CARB procedures.

NMMA submitted information from Pleasurecraft Marine to support their position that PLT is not required. Currently, every engine at Pleasurecraft Marine is 100% tested and validated on engine run cells at the end of the production line. This validation process consists of starting and running every engine, and allowing the engine to cycle through the warm-up and come to complete operating temperature. The engine is then run up to an elevated RPM to insure that ALL computer-sensed comprehensive component diagnostics are run and pass. Every engine is checked and monitored for any type of leaks, including exhaust. Fuel pressure of every system is validated. Pleasurecraft Marine uses a bar code system that insures that the correct calibration is being downloaded into each engine. A manual validation is also recorded using the ECM checksum number. During the run cycle, engine data is recorded and filed according to engine serial number and build date to insure that every engine that gets released from production has valid, passing data on the emission control system. Serial numbers are associated with GM “hot stamp” numbers in the event of any service bulletins and/or recalls from PCM and/or any vendor, the engines can be fully tracked.

With the addition of OBDM, Pleasurecraft Marine’s control and diagnostic systems follow the same logic as the automotive industry’s OBDII. They now have closed-loop fuel control, misfire diagnostics and catalyst monitoring. Every engine with OBDM will go through a run cycle at the end of the production line the same as we currently do. In addition, all emission-related diagnostics are being run 100% to validate the integrity of the catalyst system. Further to that, these engines are always running an “end-of-line” test for us in the field, hence the development of OBDM.

With the fact that the industry has worked so diligently toward a common system that meets the requirements of reducing emissions, and constantly monitors that system for any fault or deterioration; Pleasurecraft Marine and NMMA believe that production line testing imposes a significant burden with little or no additional benefit.

Letters:

Commenter	Document #
NMMA	0688
Indmar	0667
Mercury	0693
Pleasurecraft Marine (hearing)	0642
Volvo	0708
NMMA/Pleasurecraft Marine	0748

Our Response:

We are skeptical that diagnostic systems alone are adequate for confirming that production engines routinely meet emission standards. Diagnostic systems are designed to detect defects and are not effective tools for quantifying the emission effects resulting from production variability from properly functioning engines. However, there are several factors that lead us to conclude that we should not require production-line testing for SD/I engines in this rulemaking. First, California has not yet adopted production-line testing requirements for these engines. Second, the companies producing these engines are predominantly small businesses. Third, the relatively short useful life and small sales volumes limit the overall emissions effect from these engines. Fourth, we are aware that marine engines may need additional setup time for testing to simulate the marine configuration. We do not consider any of these issues to be fundamental, but we believe it is best to defer consideration of a requirement for production-line testing until a later rulemaking. This would allow us to better understand the degree of compliance with emission standards, the effectiveness of diagnostic controls, and California's interest in requiring production-line testing. Note that we may continue to use selective enforcement auditing to evaluate the performance of production engines if we have reason to believe that this testing is necessary.

3.10.2 Other PLT issues for OB/PWC engines

This section includes additional comments related to production-line testing for Marine SI engines. See Section 1.3 for further discussion of broader issues related to production-line testing.

What Commenters Said:

Honda commented that in the interest of potentially reducing the testing burden, we suggest that a manufacturer be allowed the alternative of ramp modal testing for PLT even if the engine has been certified using the modal test.

Referring to Section 1045.301(e) in the proposal, Honda supports the option of reduced PLT but they suggest it should not be limited to carryover engines nor require two years of test results for qualification. PLT is intended to validate both factory production methodology and control (production in many cases of more than one engine family) and the production of the subject engine family. When introducing a new engine or engine family a factory with a history of producing engines that pass production line testing should be allowed to qualify an engine family for reduced testing after one quarter of passing tests. Further, the reduced testing rate should not be one per year as written in the proposal but zero until an emission related change is made to the engine family.

ECO commented that EPA should allow small-volume engine manufacturers to utilize the use of alternative testing methods (portable emissions analyzers) to demonstrate in-use field testing compliance for production units.

Letters:

Commenter	Document #
Honda	0705
ECO	0712

Our Response:

We consider ramped-modal testing and discrete-mode testing to be equivalent for a given duty cycle. Manufacturers may perform either type of cycle for certification. However, to ensure consistency, manufacturers must use the same method used for certification for any production-line testing or in-use testing. Similarly, any EPA testing would be based on the same type of cycle the manufacturer used for certification for that engine family. If manufacturers would certify based on discrete-mode testing and would want to do ramped-modal testing for production-line engines, they would need to submit test results from ramped-modal procedures as part of a revised application for certification.

Production-line testing with the CumSum statistical procedures to establish sampling rates involves relatively low levels of testing to establish that engine family meets emission standards taking into account the variability associated with production tolerances and other assembly variables. After new emission standards take effect is an especially important time for testing to confirm that engines are meeting emission standards. We believe two years of testing with a given engine family is necessary to gain enough confidence to reduce the testing rate to a token level. Test results demonstrating compliance with previous standards or test results from different engine families do not provide a sufficient assurance that the production variability of a given engine family is adequately understood and controlled to demonstrate that production engines will uniformly comply with emission standards. This is especially important for engine families that generate or use emission credits, since manufacturers should take production variability into account when they establish a family emission limit.

We note that we would make an exception for outboard or personal watercraft engines certified with a family emission limit under the current standards if manufacturers certify the same engine model under the new standards using the same family emission limit. In this case, we could consider two years of data showing consistent compliance with emission standards to establish a lower testing rate for further production, even if that testing occurred before the effective date of the new emission standards.

It is important to continue testing at least one engine from each engine family even after we agree that less testing is required. Manufacturers often make minor changes over time that should be reflected in ongoing measurement, if only occasionally. For example, manufacturers may make several running changes to their certified configuration over time based on engineering developments, changed suppliers of emission-related components, updated assembly procedures, or simply turnover in production workers. We believe it is reasonable for manufacturers to test one engine per year as a minimal step to confirm that the engines being produced continue to meet emission standards. We would want to be able to require manufacturers to restart the normal regimen for production-line testing if a problem arises. We would have no easy way of making this determination if manufacturers would completely discontinue testing of production engines.

We agree that the regulations should allow for simpler measurement methods for production-line testing, as described in Section 1.3.4.

3.11 In-use testing

3.11.1 In-use testing for SD/I engines

What Commenters Said:

NMMA and Mercury Marine commented that EPA proposes to exempt SD/I engines from in- use testing in the proposed rule in § 1045.401(a). NMMA agrees with EPA that in- use testing is not feasible for SD/I engine manufacturers given that SD/I engines are installed in vessels and these engines would need to be removed for laboratory testing. Such testing would practically destroy the vessel—a consequence that boat owners would want to prevent.

NMMA and Mercury continued that EPA also asks for comments on other approaches that could be used for accumulating operating hours with SD/I engines to make in- use testing possible. 72 Fed. Reg. at 28,124. EPA's suggestion that SD/I engine manufacturers could perform in-use tests on boats maintained for research and development or for company use is impractical and contrary to the intended purposes of these boats. Boats used for research and development may not represent the configurations that are actually in the field or they may not have a representative service accumulation. As for company fleets used for recreation, such fleets also would not likely include all of a company's products and/or the vessels may not have sufficient in-use service accumulation. Another important consideration is that OBD systems will be installed with SD/I engines. The OBD system will notify the owner and operator of any problems with the emission control system and parts that need to be repaired. For these reasons, EPA's determination that SD/I engines be exempt from in- use testing requirements makes sense.

NESCAUM commented that it is essential that the engines affected by this rulemaking meet the applicable standards for the entire useful life of the equipment into which they are installed. Consequently, they contend that the proposed requirements for verifying durability of emissions controls, as they pertain to SD/I engines and [vessels], are inadequate, principally because there are no requirements for in-use emissions testing. ... Consistent with the durability requirements pertaining to OB/PWC engines, they urge EPA to incorporate similar requirements for manufacturers of land-based SI and SD/I engines and equipment, including a robust in-use testing program.

Letters:

Commenter	Document #
NMMA	0688
NESCAUM	0641
Mercury	0693

Our Response:

The industry comments generally reinforce the reasons we gave in the proposal to suggest that in-use testing would not be appropriate for SD/I engines. We believe the best approach for ensuring proper in-use control is to explore the viability of collecting data from installed marine engines using portable analyzers. The requirements related to torque broadcasting and access ports in exhaust systems make this possible. This will be especially relevant for evaluating compliance with Not-to-Exceed standards. Rather than requiring manufacturers to perform this testing after accumulating some specified degree of service hours, we intend to perform our own testing as needed to gain experience with the measurement technology and sampling and testing protocols.

3.11.2 In-use testing for OB/PWC engines

What Commenters Said:

NMMA commented for OB and PWC engines, EPA is proposing to continue to require in-use testing of field-aged engines to determine whether they continue to meet the emissions standards. 72 Fed. Reg. at 28,134. Proposed subpart E contains the provisions related to the manufacturer-run in-use testing program. PWC and OB engine manufacturers have had to comply with in-use testing requirements for almost a decade. What NMMA members have seen over the years is that the in- use program is a highly resource intensive program with very little, if any, environmental benefit. The costs to manufacturers for locating and obtaining the engines, extracting the engines in the case of PWCs (sometimes practically destroying the product), and dedicating personnel to conducting the tests are significant. Also adding to the cost of these tests has been the lack of adequate notification to manufacturers of the particular engines that must be tested. In some cases, in-use test orders have been received by manufacturers after the start of the following model year, which has significantly increased the burden on manufacturers to obtain engines and conduct testing in a timely manner. With all of these costs, NMMA members have not seen a single engine family fail the in-use test requirements in the past ten years. From a cost-benefit perspective, therefore, there is no justification for retaining the in-use testing program for PWC and OB engines in this new rule. Any concerns about backsliding with the removal of this program from final rule are unfounded given that other enforcement programs, e.g., EPA's Selective Enforcement Audit Program, will ensure continued compliance with the emissions standards. NMMA fails to see how the continued application of the in- use program to PWC and OB engine manufacturers is justified from a cost-benefit perspective.

NMMA continued to comment that the in- use testing program was included in the final 1996 rule for PWC and OB engines in order to "provide information regarding the in- use emission performance of engines in relation to the expected in- use performance to which the engines were designed and built." See Control of Air Pollution; Final Rule for New Gasoline Spark Ignition Marine Engines; Exemptions for New Nonroad Compression Ignition Engines at or Above 37 Kilowatts and New Nonroad Spark Ignition Engines at or Below 19 Kilowatts, Final Rule, 61 Fed. Reg. 52,087, 52,094 (Oct. 4, 1996). EPA also explained that such a program was "advantageous because it is an innovative method of gaining acceptable knowledge of in-use engine emission performance." Id. With the experiences gained in implementing this program and the lack of any engine family failure, the in-use program has served its intended purpose. Continuing a regulatory program merely for the sake of the program is poor policy and ignores the considerable costs and resource burden associated with the in- use testing program.

NMMA commented that another important consideration is that the requirement to install an OBD system as specified in § 1045.110 will ensure that an owner is notified in the field of any problems with the emission control system. For all these reasons, NMMA believes the best approach is to amend § 1045.401(a) to include the following provision: "Engines equipped with an on-board diagnostic system meeting the requirements in § 1045.110 of this subpart are exempt from the requirements of this section."

NMMA continued that if EPA elects to retain the in- use testing program, despite the lack of any environmental benefit and the considerable costs, there are several revisions to §1045.405 that must be included in the final rule. While NMMA appreciates EPA's efforts to set out a schedule in § 1045.405(b)(1) for EPA to notify the manufacturer as to which engine families must be tested, the proposed text of § 1045.405(b)(2) is burdensome and requires revision. To that end, NMMA recommends several changes to proposed § 1045.405(b)(2) to ensure that manufacturers are not penalized for certification applications that are received after December 31 of a given calendar year for engines that are early production models. NMMA also suggests that the in- use testing burden be reduced for carryover engines and for engines that have not experienced any in-use testing failures for the past two years. The recommended revisions are included below in redline.

§ 1045.405 How does this program work?
* * * *
(b) The provisions of this paragraph (b) describe how test families are selected, depending on when we receive the application for certification.
(1) If we receive the application or a letter of intent with a list of all engine families you will be certifying and the estimated dates of production by December 31 of a given calendar year for the following model year (for example, by December 31, 2009 for model year 2010), we would expect to select engine families for testing by February 28 of the model year. If we have not completed the selection of engine families by February 28, you may select your own engine families for in- use testing. In this case, you must make your selections and notify us which engine families you have selected by March 31. You should consider the following factors in selecting engine families, in priority order:
(i) Select an engine family that has not recently been tested in an in-use testing regimen (and passed) under the provisions of this subpart. This should generally involve engine families that have not been selected in the previous two model years. If design changes have required new testing for certification, we would consider that this engine family has not been selected for in-use testing.
(ii) Select an engine family if we have approved an alternative approach to establishing a deterioration factor under § 1045.245(b)(7).
(iii) Select the engine family with the highest projected U.S.-directed production volume.
(2) If we receive an application for a given model year after December 31 of the previous calendar year, you must conduct in-use testing with that engine family without regard to the limitations specified in paragraph (a) of this section, unless the engine family is a carryover or we waive this requirement. We will generally waive

> testing under this paragraph (b)(2) only for small volume engine manufacturers or in the case where similar testing was recently completed for a related engine family or the engine family has not failed an in- use test in the past two years.

In addition to these revisions, NMMA recommends that EPA reduce the annual quantity of engine families required for testing to two engine families per year given the compliance history of these engines. These changes will help reduce the burden of the in-use testing program for OB and PWC engine manufacturers while meeting the basic objectives of that program. Lastly, NMMA recommends adding a new paragraph (e) to § 1045.405 as follows:

> (e) In appropriate extreme and unusual circumstances that are clearly outside the control of the manufacturer and could not have been avoided by the exercise of prudence, diligence, and due care, we may waive the in-use testing requirement for an engine family.

Suzuki commented that unlike similar programs conducted with on-highway vehicles, outboard engines used for in-use testing are not procured from privately owned sources for a variety of reasons, and are basically engines operated for the sole purpose of service accumulation needed for compliance with the in-use testing program. This testing is extremely resource intensive, and requires the sacrifice of numerous expensive outboard engines each year. Additionally, because the engines used for in-use testing are operated solely for the purpose of engine age accumulation for the EPA program, literally hundreds of hours of engine operation occur for each engine test group selected for in-use testing for the single purpose of service accumulation for in-use testing.

Suzuki continued to comment that it is arguable that this program had merit in the initial years of outboard engine certification, during which time new technologies were being introduced to replace long established technologies and EPA needed to ensure that proper emissions system durability existed for this then-newly regulated engine category. What has been demonstrated in the years since that time is that the outboard engine industry is building a very robust product. As evidence, Suzuki is not aware of a single case of failure of an outboard engine family selected for in-use testing from any manufacturer.

Considering this exemplary performance from the entire industry, Suzuki does not believe continuation of the in-use testing program for outboard engines can be justified at this time. Suzuki requests that the program be suspended until such time that EPA can demonstrate a compelling need to reinstate the program.

BRP has been subject to the in-use testing requirements of 40 CFR Part 90 since their inception. The EPA proposal maintains the current in-use requirements and provides some relief from the in-use order timing issues BRP and other manufacturers have experienced. While BRP appreciates EPA's efforts to streamline the implementation of this program, it is a program which as outlived its usefulness. To date, BRP has not had a single engine family fail this in-use program. This program costs BRP approximately $200,000 US dollars annually, and does not provide any emission reduction or benefit to the environment.

BRP is requesting EPA to remove the in-use program from the proposed regulation. Alternatively, BRP request to have in-use testing apply only to engine families which have failed the production line testing requirements.

Letters:

Commenter	Document #
NMMA	0688
Bombardier	0674
Mercury	0693
Suzuki	0698

Our Response:

In-use testing can provide very valuable information to confirm that engines are complying with emission standards after many hours of operation under in-use conditions. We believe this is especially relevant in the context of Not-to-Exceed standards. Manufacturers may also choose to do their in-use testing with portable analyzers with engines that remain installed on a vessel. This would be the best way of characterizing the effectiveness of an engine's emission controls. This would also allow for nondestructive testing with personal watercraft engines. We understand there have been very low failure rates on OB/PWC engine families previously selected for in-use testing, nevertheless, there remains a need for on-going oversight. We do not believe that the beginning of a new emissions program is a good time to reduce oversight. We will continue to monitor results and may adjust testing rates as appropriate if the results consistently meet the standards.

At the same time, we understand the concerns related to the burden of service accumulation with in-use engines and repeat measurements within an engine model in successive years. While we believe the specified sampling rate of 25 percent of engine families is appropriate to ensure that we can adequately cover the range of engine families that should be tested, we do not intend to require in-use testing for any engines that have already demonstrated compliance under an in-use testing program. This would apply if an engine family's certification is based on carryover of emission data from an earlier engine family for which in-use testing results were adequate to establish compliance with emission standards. We would nevertheless be able to select such an engine family for testing if we had a reason to believe that this testing was necessary, such as a changed family emission limit, increased variability from testing with production-line engines, or reported emission-related defects.

As noted in the proposal, we are committing to a schedule for selecting engine families in time for manufacturers to be able to establish a fleet for in-use testing. The proposed approach depends on holding manufacturers responsible for products they produce after the scheduled time for selecting engine families. Also as noted in the proposal, if manufacturers do not want to be subject to automatic in-use testing obligations, they can simply assign the engine family to the following model year. This would then put that engine family into the pool of available families for us to select for the upcoming model year. It is not necessary to specify that carryover engines are exempt from this scheduling requirement, since we will generally not be selecting carryover engine families for testing if they have already passed under the in-use testing program, as described above. If such an engine family were not yet tested, or it were tested without passing, we would not want to exempt it from the provisions related to timely certification with respect to in-use testing requirements.

There is no requirement to use diagnostic systems for outboard or personal watercraft engines, so it would not be appropriate for us to tie in-use testing requirements to such a system. Moreover, diagnostic systems are intended to find defects and are not effective at evaluating the emission levels relative to an emission standard (or a family emission limit).

We agree with the manufacturers' suggestion that the regulations should include "force majeure" provisions that would allow for revising the plan for performing in-use testing if circumstances outside manufacturers' control prevent them from completing the necessary service accumulation.

3.12 Compliance provisions

3.12.1 Competition exemption

What Commenters Said:

Mercury Marine and NMMA commented that Mercury Racing manufactures engines, both for the recreational market and for competition racing. In some cases, engines used in competitive events are the same as the recreational engines and would be certified engines. However, Mercury Racing also produces engines that are strictly for racing and would be inappropriate for recreational use.

Mercury and NMMA continued to comment that in addition to the exemptions provided in 40 C.F.R. Part 1068, EPA is proposing to include an exemption for engines used for competition similar to other off-road programs. To qualify for the proposed exemption in § 1045.620, a Marine SI engine would have to meet all four criteria, which include restricted display, sales and use as well as superior performance characteristics. While several of these criteria are similar to those required for other programs, such as the competition exemption in 40 C.F.R. § 1051.620 exemption for snowmobiles and ATVs, there are several differences which are problematic and need to be resolved before EPA finalizes this provision. Namely, the first criterion in § 1045.620(c)(1) requires that "neither the engine nor any vessels containing the engine may be displayed for sale in public dealerships or otherwise offered for sale to the general public." 72 Fed. Reg. at 28,282 (proposed § 1045.620(c)(1)) (emphasis added). The italicized language is not only additional to what is required for other programs but it also would make boat show displays of the racing engine or vessel impossible. The public dealership restriction also is not workable with this industry as it is common practice for a dealership to sponsor a racing team and display the boat used for competition on the sales floor. This type of display is not intended as a sale of the vessel and instead is a promotional effort to sell other boats, however, CARB's interpretation is that if a boat is displayed at a dealership or boat show, it is deemed to be "For Sale" unless it is clearly labeled as not being for sale. Mercury Marine recommends that the first criterion be eliminated.

The third criterion, which requires that the engine have performance characteristics that are substantially superior to noncompetitive models also is a concern. There are some engines in a competition class that may not have performance characteristics that are "superior." For example, some racing classes of engines have engine displacement or horsepower restrictions to equalize the field. Mercury Marine suggests that this criterion be revised as set forth in the redline below.

In addition, the requirement in proposed § 1045.620(c)(4) and (e) regarding the restricted use of the competition engines places an undue burden on Marine SI engine manufacturers. There is no such restriction included in the competition exemption for other programs. While manufacturers of marine engines may have control over whether the competition engines are sold to racing teams and other qualified racers, once the sale occurs to the appropriate entity, the manufacturer has no way of restricting the use of the engine. To address this situation, Mercury Marine recommends that EPA delete § 1045.620(c)(4) and rephrase (e) so that the types of events listed are provided as examples.

The following redline of § 1045.620 is provided to illustrate our recommended revisions to the section:

§ 1045.620 What are the provisions for exempting engines used solely for competition?

The provisions of this section apply for new engines and vessels built on or after January 1, 2009.

(a) We may grant you an exemption from the standards and requirements of this part for a new engine on the grounds that it is to be used solely for competition. The requirements of this part, other than those in this section, do not apply to engines that we exempt for use solely for competition.

30

(b) We will exempt engines that we determine will be used solely for competition. The basis of our determination is described in paragraphs (c) and (d) of this section. Exemptions granted under this section are good for only one model year and you must request renewal for each subsequent model year. We will not approve your renewal request if we determine the engine will not be used solely for competition.

(c) Engines meeting all the following criteria are considered to be used solely for competition:

(2) Sale of the vessel in which the engine is installed must be limited to professional racers or other qualified racers.

(3) The engine must have characteristics that are substantially different from noncompetitive models rendering them unsuitable for recreational use, e.g., a transmission that cannot be engaged/disengaged while the engine is running.

(d) You may ask us to approve an exemption for engines not meeting the criteria listed in paragraph (c) of this section as long as you have clear and convincing evidence that the engines will be used solely for competition.

(e) Engines are considered to be used solely for competition if their use is limited to competition events sanctioned by the U.S. Coast Guard or another public organization. Operation of such engines may include racing events, speed record attempts, official time trials and test/trial runs in preparation for racing events. Use of exempt engines in any recreational events, such as poker runs and lobster boat races, is a violation by the boat owner of 40 CFR 1068.101(b)(4).

(f) You must permanently label engines exempted under this section to clearly indicate that they are to be used only for competition. Failure to properly label an engine will void the exemption for that engine.

(g) If we request it, you must provide us any information we need to determine whether the engines are used solely for competition. This would

> include documentation regarding the number of engines and the ultimate purchaser of each engine as well as any documentation showing a vessel manufacturer's request for an exempted engine. Keep these records for five years.

Mercury stated that these recommended changes will ensure that the competition exemption achieves its intended purpose while reflecting how these engines are distinct from conventional Marine SI engines and how they are actually marketed. Mercury supplied the issues they have with the Competition Use Exemption 1045.620. They stated that they do not think anything they are suggesting changes the intent, they just do not want to see enforcement actions taken due to wording.

(c) In the meeting, Alan Stout said that companies needed to meet one or more of the criteria. This says they must meet all of the criteria.

(1) These boats are often displayed at dealerships. While they are not for sale to the public, dealers may not be aware that they would have to make it clear on the display that they are not for sale. Mercury feels it should say that they can be displayed, but not sold to, the general public.

(2) OK

(3) Many classes of racing limit engine size or Hp so this statement may not always be true. A statement that these engines "may have characteristics the are different from non-competitive engines" would be more accurate. Some have very short gearcases (OB), some are start in gear (no neutral), some require leaded fuel, etc. Also, some are standard old 2-strokes that certain racing classes standardized on (APBA has a class that can only run Mercury 25 Hp 2-strokes on very small hydroplane boats.)

(e) Use should also include practice for a sanctioned racing event.

Mercury concluded that everything else is OK.

Letters:

Commenter	Document #
NMMA	0688
Mercury	0693
Mercury	

Our Response:

The commenters object to the proposed provision disallowing competition models from being "displayed for sale" on the basis that the competition models are displayed merely to promote noncompetition models. However, the proposed provision clearly would prohibit displaying competition models "for sale" while not prohibiting their display for other purposes, such as promoting noncompetition models. This clarification should be sufficient to address the commenters' concerns. Furthermore, our regulation has no bearing on California's enforcement of their own regulations. We believe there is no need to change the provision in question. In fact, making the recommended change would amount to permission to display the engines for sale to the general public, which would completely undermine any assurance that the exemption would not be abused.

We contemplated the situation in which engines would be used only for competition without meeting all the criteria proposed under §1045.620(c). To address this possibility, we proposed §1045.620(d), which allows us to approve an exemption in cases where the manufacturer can provide clear and convincing evidence that an engine will be used solely for competition. We believe this provision addresses the commenters' concerns and that the proposed regulations do not need to be changed.

We believe it is entirely appropriate for the regulations to prohibit the use of exempted competition engines for noncompetition purposes. This has been identified in §1068.101 as a prohibited act since 2002. We have referenced this prohibition in §1039.620 for nonroad diesel engines and in §1048.630 for Large SI engines. Furthermore, aside from Marine SI engines, we have proposed language referencing this prohibition in §1054.620 for Small SI engines and in §1045.620 for marine diesel engines. We believe the specific language in the regulation is appropriate for delineating the type of operation that we would consider appropriate for exempted engines. We have stated that operation of competitive engines may include only racing events, trials to qualify for racing events, and practice associated with racing events in §1045.620(e) as a clarification of what is considered to be competition, rather than as an additional prohibition. Finally, we believe that Mercury's concern results from a mistaken interpretation of §1045.620(e) that we would void the exemption for the engine manufacturer based on the inappropriate use of the engine for which the manufacturer was not reasonably responsible. These clarifications should be sufficient to address the commenters' concerns. We believe there is no need to change the provision in question.

3.12.2 Personal use exemption

What Commenters Said:

N. Leggett (0603) commented that the proposed rules allow individuals to build vessels for their own personal use without regulation. This is a wise idea that supports the American tradition of do-it-yourself and it allows inventors and other creative technologists to build vessels that are totally their own design. However, part (c) "No individual may manufacture more than one vessel in any ten-year period under this exemption" has a major problem. If a person is building small vessels, he or she will probably be interested in building more than one vehicle in a ten year period. The commenter built a small (one-man) hovercraft and the project certainly did not keep him busy for 10 years. However, if a person is building a large yacht, he or she will probably build only one yacht in ten years. The commenter stated that we need an exemption that is related to the size of the boat being built. A person who is building little runabouts should be allowed to build several of them in ten years. A person building a very large boat will probably not be inhibited by a one boat in ten year limit. At least three size thresholds are needed to make this exemption realistically meet the needs of individuals building vessels for their own personal use.

N. Leggett (0612) commented that individuals who build boats for their own personal use should be allowed to build up to three small boats (under 20 feet overall length), or two medium size boats (under 35 feet overall length) or one larger boat in a 10-year period. These boats would be exempted from the regulations. This is a change from the proposed limit of one boat in a 10-year period. People building a mix of smaller and larger boats would be limited to a total of two boats. This exemption would apply to hovercraft, hydrofoils, and airboats as well as to conventional boats.

Letters:

Commenter	Document #
N. Leggett	0603
N. Leggett	0612

Our Response:

We intended the personal-use exemption more to allow someone to build a boat for his own personal use rather than creating a path for hobbyists to continuously produce new homemade vessels. On the other hand, we believe it is appropriate to consider that five years (rather than the proposed ten years) is an appropriate period for expecting someone to use a homemade boat. Circumstances might change over that time such that a different size or type of vessel would meet an individual's needs. We are therefore changing the proposed regulation to specify that a person may make one exempt vessel over any five-year period. We believe this is preferable to allowing some number of vessels to avoid creating an expectation or an allowance for continuous production of homemade vessels. The five-year period aligns with the proposed restriction against selling an exempted vessel for five years after construction. Any more frequent construction would only put a personal boat builder in a position of owning multiple boats at one time for his personal use. We believe it is not necessary to accommodate this concern.

3.12.3 Allowance to use Small SI engines

What Commenters Said:

Ingenium commented that they are writing in response to the April 17, 2007 announcement by the EPA to create new legislation that would regulate emissions from Inboard marine engines. The proposed regulations propose to place particularly stringent emissions controls on Stern Drive and Inboard engines, more stringent than either outboard engines or personal watercraft engines. This appears to be a decision made because the preponderance of Stern Drive and Inboard engines are automotive based and so those engines can benefit from a vast array of emissions technology developed in the automotive world. In addition, the large marine manufacturers like Mercury Marine and others, have the R&D and other financial resources to develop other emissions capabilities such as water cooled three way catalysts, on their own. Since they produce the vast majority of marine specific engines and they are manufacturers.

Ingenium continued to comment that it appears, based on the second paragraph of page 42 of 40 CFR that the EPA recognizes that there may be smaller Inboard engines in use that EPA is not currently aware of and EPA makes the assumption that these smaller engines would have similar emissions control capabilities as their larger Inboard counterparts. The EPA also "requests comment on the need for adjusting these proposed standards to accommodate any technical constraints related to their unique designs." So they are writing in response to this request for comment.

Ingenium Product Development, Inc. has spent the last three years developing a new type of marine propulsion system for very small boats that uses V-twin air cooled engines from the lawn and garden industry to propel the boat. Their product can be seen at: http://www.ven-tboats.com. At the current time their plans are to use engines between about 10 hp and 36 hp which are manufactured by Briggs and Stratton and other companies. They are air cooled, carbureted four-cycle engines. These engines are very low in cost and so they hope to be able to reduce the cost of the final product to the consumer. To their knowledge they are the only manufacturer in the USA that is using these types of engines in an inboard configuration. There are some other manufacturers like Mudbuddy using these same engines in an Outboard configuration. The volumes they anticipate are always going to be low, perhaps 1,500 - 2,500 per year after five more years of growth. So they are a miniscule contribution to the world's emissions problem.

Ingenium commented that these engines are not on the same developmental timeline as automobile engines as far as emissions. In fact the small engine regulations that are being proposed for the lawn and garden industry lag behind the marine standards by several years. Large manufacturers of air cooled L&G engines produce millions of these engines per year. There is simply no way they will modify our tiny fraction of engines that are used for the marine markets to accommodate special emissions capabilities. Put another way if they cannot use these engines as they are they will have to go out of business. Ingenium sees that EPA has some type of waiver language in the proposal if the total number of engines used from other industries is less than 5% of a manufacturer’s total. They would fall under that comfortably because again, Briggs and Stratton makes millions of these engines for their primary intended market, riding lawnmowers.

Ingenium commented that it seems that they need some type of waiver or allowance to use these engines or maybe the proposal already covers their situation and they just cannot find it. At this time they are requesting that EPA respectfully consider their request for special allowance to use 4-cycle carbureted engines from the Lawn and Garden engine manufacturers, in a limited volume marine application, with the emissions controls that are in place on the engine as purchased from the manufacturer.

ARB does not support using certified small spark-ignition engines in marine applications without certifying to the marine spark-ignition emission standards. ARB’s recreational marine engine programs have additional important requirements such as consumer “Star” labels, different useful life periods, and issues specific to use in a marine environment. As an alternative, ARB recommends that carry-over of certification data and DFs should be allowed where appropriate, thereby reducing the certification burden.

Honda has concerns with the proposal for extraordinary labeling and reporting for one specific application of general purpose engines. In §1045.605(d)(5), small volume products that use these engines, such as mud/swamp boats, have been singled out for the addition of a supplemental label. While the engines will have small engine emission labels confirming regulatory compliance, the Proposal has clearly carved a niche for these unique engine applications. This requirement will inherently present added burden to the very small business entities producing these products and we do not understand its purpose or benefit expected from it.

EMA commented that engine manufacturers do not have the ability to control their customer's novel use of engines that are designed and intended for utility (i.e., a wide variety of product) applications. To the extent that the engines involved are not marinized, EPA should not differentiate utility engines from any other product application. Engines that are either Small SI or certified to the Small SI requirements defined in 40 CFR Part 1054/1060 by provisions allowed in 40 CFR Part 1048 should not be required to be certified to the Marine SI emission standards found in 40 CFR Part 1045. If such engines are required to be tested under the Part 1045 procedures, the benefits associated with not having to certify to Part 1045 would be eliminated.

EMA continued to state that the provisions of §91.1013 EXEMPTION FOR CERTIFIED SMALL SI ENGINES allow manufacturers to use marine engines that have been certified to emission standards for non-road spark-ignition engines below 19 kW without recertifying those engines under part 91. This proposed language should be revised in a fashion similar to §1045.605. Specifically, this section also should include references to engines certified to either 40 CFR Part 90 or 40 CFR Part 1054 in order to avoid confusion and ensure that engines <=1000 cc displacement and <=30 kW certified to either 40 CFR 90 or 40 CFR Part 1054 are acceptable.

EMA commented that this section (§91.1013) also includes a reference to §1045.605, which requires SORE engines used as marine propulsion engines to comply with special labeling and record keeping requirements. The requirements specified in §1045.605(d)(2), and (5) - (7) only should be applicable to vessel manufacturers. The engine manufacturer does not have the ability to ensure that these requirements are fulfilled. To satisfy the requirements of §1045.605(d)(3), the engine manufacturer should only be required to submit a statement of compliance that indicates that the majority of the applicable engine family's sales are not used for marine propulsion.

Marine propulsion engines are generally regulated per 40 CFR Part 91 and 1045 as identified. However, per §1045.605 engines that are certified to the requirements of 40 CFR Part 1054 are also considered valid without separate application for certification under Part 1045. We recommend that the language of §1054.5(c) "Which nonroad engines are excluded from this part's requirements?" be revised to read: (c) Propulsion marine engines. See 40 CFR parts 91 and 1045. Note that engines certified for compliance with Part 1054 may be utilized for marine propulsion as described in §1045.605. Note that the evaporative emission standards....."

Letters:

Commenter	Document #
Ingenium	0616
CARB	0682
Honda	0705
EMA	0691

Our Response:

We appreciate the informative comment from Ingenium, pointing out that there are very small inboard engines that are not based on automotive technology. We believe it is appropriate to expand the provision for using engines certified to Small SI standards to sterndrive and inboard engines rather than limiting this to outboard and personal watercraft engines. This is appropriate for Small SI engines certified under the Phase 2 standards in part 90 or the Phase 3 standards in part 1054.

We believe the allowance to use marine engines that have been certified to standards for land-based products is an important provision to address concerns for small businesses and for niche products. By limiting the numbers of these cross-certified engines to a small fraction of their total sales, we are able to address these concerns without undermining the marine regulations in which we have developed a unique set of requirements with respect to engine operation, useful life, engine maintenance, and other important parameters. Requiring even a streamlined certification, as California ARB suggests, would still pose a burden that we believe is not appropriate for small numbers of engines that have already been certified to EPA standards.

We proposed to allow conversion of land-based engines for marine applications under the provisions of §1045.605. This applied for engines certified to the Small SI standards only if they were used in outboard or personal watercraft applications. The provisions of 1045.605 included labeling and reporting requirements to document the changes involved in installing the engine in a vessel. However, we are adopting a provision allowing broader use of small numbers of certified Small SI engines for marine propulsion (see §1045.610). As long as these engines are installed without modification in a vessel, we will accept the Small SI certification, with no additional testing required, as valid for the marine installation. This is similar to the approach we have taken for constant-speed diesel engines that may be used in land-based or marine auxiliary applications (see §1042.610). This simpler approach is appropriate for these engines because they are typically “drop-in” models that operate very similar to the way they would for any number of land-based applications. The sales volumes are also very small relative to the total sales in the engine families, and the marine installation is often performed by the owner of the engine.

The regulations include language in §91.1013 that simply references §1045.610. All the provisions in §1045.610, including the changes we make for the final rule, apply automatically for engines subject to emission standards under part 91. The final version of §1045.610 will include language including engines certified under either the Phase 2 standards in part 90 or the Phase 3 standards in part 1054.

Engines that are certified under part 1054 and eventually used in a marine application under the provisions of §1045.610 are still subject to all the requirements and prohibitions that apply under part 1054. It is therefore not appropriate to include a reference to §1045.605 or §1045.610 in §1054.5 where we describe which engines are excluded from the requirements of part 1054. At point of sale, Small SI engines should meet the Small SI exhaust standards, as noted above. However, once the engine is installed in a recreational marine vessel, then the vessel is subject to the OB/PWC or SD/I evaporative standards.

3.12.4 Replacement engines

What Commenters Said:

NMMA and Mercury Marine commented that in certain situations SD/I engines must be repowered due to problems associated with normal “wear and tear” or damage to the existing engine block. For these cases, the marine engine manufacturer would need to be able to replace the original engine block with a comparable engine that would allow the boat owner to use many of the existing components from the original engine. Since the new engine block is dropped into the existing vessel in the exact location, it is imperative that the replacement engine fit into the space allotted for the engine block. New engines that will be built to meet the standards proposed in this rulemaking will not, in most cases, be able to fit in the space allotted to existing engines. For these reasons, NMMA and Mercury support the flexibility provided by the proposed revisions to the exemptions in § 1068.240, which address the situations where the engine being replaced is not subject to the emissions standards or is subject to less stringent emissions standards than those that would apply to a new engine. 72 Fed. Reg. at 28,378. The proposed revisions would permit a manufacturer to produce and sell a replacement engine identical in all respects to the engine being replaced without violating the prohibited acts in § 1068.101. These revisions are necessary to allow marine engine manufacturers to continue to provide customers with replacements for existing engines.

Indmar commented that in certain situations SD/I engines must be replaced due to problems associated with normal “wear and tear” or damage to the existing engine block. New catalyst equipped engines may not package in the space allotted for non-catalyst equipped engines. Also the boat wiring would not match the electronics of the new engines. The replacement of engines in old boats as defined in 1068.240 is supported by Indmar. This allows us to keep customers who have engine problems with old boats satisfied and still meet the intent of clean air.

Letters:

Commenter	Document #
NMMA	0688
Indmar	0667
Mercury	0693

Our Response:

We are adopting the proposed replacement-engine provisions, as supported by the comments. Note that we are revising the replacement-engine provisions as described in Section 1.5. The modified §1068.240 nevertheless continues to address the concerns expressed by the commenters.

3.12.5 Defect reporting

What Commenters Said:

NMMA and Mercury Marine commented that EPA is proposing to apply the defect reporting requirements in § 1068.501 to marine engines in place of the requirements in 40 C.F.R. Part 85, which are currently applicable to only PWC and OB engines. 72 Fed. Reg. at 28,203. For the investigation threshold, EPA's proposal would require 10 percent of total production up to a total production of 50,000 engines but never fewer than 50 for any single engine family in one model year. 72 Fed. Reg. at 28,203. For production between 50,000 and 550,000 units, the investigation threshold would increase at a marginal rate of 4 percent. With regard to defect reporting requirements, EPA would require a manufacturer to report all occurrences of the same defect in all engine families and all model years that use the same part. Id. EPA proposes that the threshold reporting for a defect would be 2 percent of total production for any single engine family for production up to 50,000 units, but never fewer than 20 for any single engine family in one model year. Id. For production between 50,000 and 550,000 units, the reporting threshold would increase at a marginal rate of 1 percent. For all production above 550,000, a threshold of 6,000 engines would apply.

NMMA and Mercury commented that the new proposed defect reporting requirements would cover defects for emission-related components or systems containing the following components: "electronic control units, aftertreatment devices, fuel metering components, EGR-system components, crankcase- ventilation valves, all components related to charge-air compression and cooling, and all sensors associated with any of these components." 72 Fed. Reg. at 28,388 (proposed § 1068.501(a)(1)(i)). Defects related to engines and equipment subject to the evaporative emission standards also would be covered, including defects related to fuel tanks, fuel caps, and fuel lines and connectors. 72 Fed. Reg. at 28,388 (proposed § 1068.501(a)(1)(ii)).

NMMA and Mercury commented that EPA's proposed requirements in § 1068.501 are different from the defect reporting requirements that SD/I engine manufacturers will have to comply with in California. See CAL. CODE REGS. tit. 13, § 2144 (2007). Given that many of the SD/I engine manufacturers are small businesses, NMMA and Mercury recommend that EPA allow SD/I engine manufacturers to comply with the California program as a substitute for the federal program. The California program requires a manufacturer to file an emission warranty information report for each quarter when the cumulative number of unscreened warranty claims for a specific emission related component or repair represent at least 1 percent or 25, whichever is greater, of the engines of a California-certified test group. Id. By giving SD/I manufacturers the option to comply with the California program for defect reporting, EPA would reduce the administrative burden that would be imposed on these companies by having to comply with two different defect reporting schemes.

NMMA and Mercury commented for the PWC and OB engine manufacturers, the new proposed defect reporting program differs from Part 85 in several respects, both in the investigation threshold and the reporting threshold. Part 85 requires a defect report to be filed when the manufacturer determines that a specific emission-related defect exists in 25 or more engines of the same model year. 40 C.F.R. § 85.1903(a). The current program is well-known across the OB and PWC industry, and NMMA fails to see the utility in changing the existing defect reporting requirements that will merely serve to increase the regulatory burden with no perceived environmental benefit. To that end, NMMA and Mercury recommend that EPA retain the current defect reporting program for PWC and OB engine manufacturers.

NMMA and Mercury commented that for boat builders and component manufacturers, the expanded scope of the defect reporting requirements to include components subject to the evaporative emissions standards may overwhelm this industry. A major concern held by NMMA members is the ability of small business boat builders and component manufacturers to track the requisite information in an industry that is not vertically integrated. A large number of the boat builders and component manufacturers are small businesses and do not have the staff or sophisticated systems to track warranty claims. In addition, recreational marine dealerships are not as sophisticated or as organized as those for light-duty vehicles or for Recreational Vehicles. There are many small dealerships that do not have the resources or capabilities to track the information required by EPA's proposed defect reporting program. This makes determining whether the investigation and reporting thresholds are triggered particularly difficult and burdensome. As stated in the NMMA testimony, there are a number of boat builders that do not understand the requirements in this proposed rule or are even aware that a rule exists. Significant outreach is needed by EPA and industry to make certain that these companies are aware of the requirements and receive the necessary training. To address this problem, NMMA suggests that EPA consider delaying the defect reporting requirements and perform a technical review in model year 2011 for evaporative emission-related parts. This should provide EPA and NMMA with enough time to conduct outreach and training.

Bombardier commented that BRP has been complying with EPA's defect reporting requirements for PWC and outboard engines for the past ten years. BRP has dedicated resources to ensure compliance with these requirements. Switching to a new defect reporting system will be a burdensome transition requiring significant revisions to BRP's current marine warranty reporting process, the implementation of new tracking software and employee training.

Pleasurecraft Marine commented in a hearing that Section 1068.501 is a lengthy section detailing an elaborate method of reporting and correcting emission related defects. This section appears more applicable to the automobile industry than the marine industry. Pleasurecraft recognizes and agrees with the need for proper and timely problem resolution as well as the associated documentation required. However, this method of defect and recall reporting represents an extreme burden for small businesses. Therefore they advocate for harmonization with the methods outlined in the California Air Resource Board procedures for defect and recall protocols.

Letters:

Commenter	Document #
NMMA	0688
Bombardier	0674
Mercury	0693
Pleasurecraft Marine (hearing)	0642

Our Response:

We are moving to apply the defect-reporting requirements broadly across all our nonroad engine programs. For Marine SI engines and for most other engine categories, this moves us away from current requirements, which are based on a simple numerical threshold of 25 defects regardless of the size of the engine family. We believe this threshold should be scaled to the size of the engine family to avoid the burden for manufacturers and EPA to generate and review defect reports where the defect rate might be minuscule. Another aspect of the new provisions is that they require manufacturers to monitor warranty claims and other available information to determine whether they exceed the specified defect thresholds. Under the current regulations, there is no clear requirement to monitor available information. We are concerned that manufacturers are not taking reasonable steps to get or process available information for making these evaluations.

Since the reporting thresholds are substantially higher than under part 91, the concern for increased burden under the new approach is only reinforcing our concern that manufacturers are not taking adequate steps today to monitor available information for potential emission-related defects. In particular, the commenters' concern about an overwhelming burden for small businesses that are not familiar with regulatory requirements is misplaced. Dealers have no new obligations under the defect-reporting requirements. In fact, we would expect dealers to be motivated for financial reasons to pass along to the certifying manufacturer detailed information about warranty claims or other indications of emission-related defects. Compliance with defect-reporting requirements falls entirely on the certifying manufacturer. The certifying manufacturer is responsible to keep track of the information coming in from dealers, owners, service personnel, and others. When potential emission-related defects exceed the specified thresholds, then the certifying manufacturer must investigate further to determine whether there is a need to report the emission-related defect to EPA.

We understand that the evaporative emissions control systems are not susceptible to emissions failure because they primarily consist of material solutions rather than moving parts. However, manufacturers should be monitoring warranty claims as good business practice, therefore the incremental monitoring for evaporative emissions systems is minimal.

We acknowledge that there would be an unreasonable burden for manufacturers to simultaneously follow EPA's defect-reporting methodology and a different methodology for California ARB. We agree that the California ARB defect reporting approach is as protective of the environment as the EPA requirement, therefore we will accept their defect reporting program as a compliance option under §1068.501(a)(6).

3.12.6 National security exemption

What Commenters Said:

Bombardier commented that BRP is supportive of the US armed forces, and is proud to offer specially designed marine spark-ignited engines for their use. Unfortunately, the proposed national security exemption requirement of 40 CFR 1068.225 (b) makes it difficult to support our military's need in a timely manner. Under 40 CFR 1068.225 (b), EPA is proposing to only issue an exemption without a request, "if it will be used or owned by an agency of the federal government responsible for national defense, where the equipment has armor, permanently attached weaponry, or other substantial features typical of military combat." The requirement "where the equipment has armor, permanently attached weaponry, or other substantial features typical of military combat" is unnecessary and burdensome. The final disposition of the engines BRP has specially designed and manufactured for military use is often classified information. Often, BRP has no way of verifying they will be used on a vessel or equipment that has armor, weaponry, or other features of combat craft. As a result, BRP will need to seek a national security exemption under the proposed 40 CFR 1068.225 (c).

BRP commented that 40 CFR 1068.225 (c) allows a manufacturer to request a national security exemption with an endorsement by an agency of the federal government responsible for national defense. This requirement is in essence identical to the current national security exemption of 40 CFR 91.1008 (2). While it is possible to meet this requirement, the current 40 CFR 91.1008 (2) can result in substantial and unnecessary delays in providing engines for our military's use. BRP feels it is imperative the US military receive their engines when they are needed without undue delay. BRP supports EPA's efforts to limit national security exemptions to agencies of the federal government responsible for national defense. However, the requirement to ensure the exempted engine will be used on equipment with armor, weaponry, or other attributes associated with combat creates a burdensome and unnecessary step in providing support to the US military.

BRP respectfully requests EPA to revise 40 CFR 1068.225 (b) to state, "Your engine/equipment is exempt without a request if it will be used or owned by an agency of the federal government responsible for national defense."

Letters:

Commenter	Document #
Bombardier	0674

Our Response:

The provisions for the national security exemption are unchanged from what currently applies under the current regulations in §91.1008. The national security exemption broadly applies across programs and has changed little since the inception of EPA’s emission control requirements. Defense agencies are very familiar with the distinction between combat and tactical applications and their need to request the exemption for tactical applications. We would expect engine manufacturers to largely be in a position of responding to orders placed by defense agencies. The burden falls on the defense agency to take care of administrative approvals associated with national security exemptions. We therefore believe the provisions of §1068.225, which have applied for other marine engines for some time, should appropriately be extended to apply equally to SD/I engines, as proposed.

3.13 Small-business issues

What Commenters Said:

NMMA noted that for small businesses, EPA is proposing to provide additional lead time for compliance with the SD/I engine exhaust standards. NMMA is very supportive of the additional compliance flexibility provided for in the rule for small businesses; however, EPA's eligibility criteria as to what constitutes a small business is problematic and is different than the Small Business Administration (SBA) definition of what is a "small business." EPA states in the preamble that "[f]or purposes of determining which engine manufacturers are eligible for the small business provisions . . . , we are proposing criteria based on a production cut-off of 5,000 SD/I engines per year." This same requirement is included in the first part of the proposed definition for "small-volume engine manufacturer" in §1045.801. The second part of the proposed definition for "small-volume engine manufacturer" in §1045.801 would allow manufacturers that exceed the production cut-off to request to be treated as a small business if they have fewer than the number of employees defined by the SBA in Title 13 CFR §121.201. According to the SBA regulations, this would mean 500 employees for businesses under the engine manufacturing NAICS. Notably, these regulations do not refer to a production volume as a prerequisite for a business in the particular industry to be classified as a "small business." Furthermore, a production cut-off was not used by EPA to determine which businesses participated on the Small Business Advocacy Review Panel on the rule, which served to provide advice and recommendations on how to address small business concerns. Two NMMA members, Marine Power and PCM, both have well under 500 employees but may occasionally produce over 5,000 engines, depending on the year. EPA's proposal would force these manufacturers to request that EPA designate them as a "small-volume engine manufacturer" under §1045.635(b) with no guarantee that they would receive the regulatory relief intended for small businesses. For these reasons, NMMA commented that EPA should revise §1045.635 so that the default is the 500 employee threshold for small-business with the option to qualify as a small-volume manufacturer if the 5,000 unit level is not exceeded. NMMA recommended specific changes to the regulatory language of §1045.635 to address their concerns.

NMMA commented that these revisions will preserve the long-standing small business threshold for this industry, as established by the SBA, while still preserving EPA's concept of the small-volume manufacturer. If EPA would like to change the small business 500 employee threshold to a lower number, NMMA commented that the Agency needs to raise this issue with the SBA and Congress.

Indmar noted that they employ approximately 100 people and produce 10,000 marine engines per year. Indmar commented that they would like the definition of small business clarified for the purpose of SD/I engines. Section III.F.1 of the preamble discusses the Small Business Advocacy involvement with the rule making and includes their definition of a small business. Section III.F.2 goes on to define small volume engine manufacturer as 5,000 SD/I engines per year but also will consider any manufacturer that meets the SBA definition. There are three inboard marine engine manufacturers that are around the 5,000 unit volume definition (Indmar included). All of these manufacturers compete for the same boat builders and an unfair competitive financial advantage could be gained by a small volume manufacturer. Also a boat builder might switch engine supplier causing a small volume manufacturer (by 5,000 definition) to no longer be small volume. Indmar commented that the 5,000 unit cutoff should be removed from the definition of small volume engine manufacturer and be replaced with the SBA definition of small business. The use of one common definition by SBA should result in less confusion down the road.

Ilmor commented that it is not in favor of using production volume of 5,000 SD/I engines per year as the cut-off criteria for determining which manufacturers are eligible for any small business provisions within this new rule. Ilmor noted that it favors the industry position that EPA should follow the Small Business Administration (SBA) guidelines for defining "small-volume engine manufacturers," which is based on number of employees. According to the SBA regulations, this would mean a cut-off based 500 employees for businesses under the engine manufacturing NAICS. The high-performance sector is the one sector of the marine industry that has been exempt from emissions compliance standards by both EPA and CARB. Every engine manufacturer within the high-performance sector is effectively a "small volume manufacturer."

Pleasurecraft Marine noted that they are a small business as defined by the Small Business Administration. Pleasurecraft commented that they recommend adoption of the universal size standards as used by the Small Business Administration under the North American Industry Classification System (NAICS) for EPA's small volume engine manufacturer definition. There are several classifications that could be used to define small businesses, all based on the number of employees, rather than units produced. From their perspective, the definition is of concern because their business has found itself falling above and below that production number that is in the rule. One year it could be applicable and not the following year again. They believe that down the line that can create a lot of confusion especially for their company.

Marine Power noted that they originally built engines for the Gulf coast shrimping and fishing industry as early as the 1960s. Today we employ about 35 people. There appears to be some ambiguity which has been discussed about the definition of a small business. Marine Power requested that EPA retain the customary definition of a small business being one less than 500 employees. They noted that they would possibly fall from one category to another in regard to the proposed 5,000 annual production limit. However, in their 32 years of history, they would always be a small business based on the SBA criteria.

Congresswoman Velazquez, Chairwoman of the Committee which oversees the Regulatory Flexibility Act (RFA), expressed concerns about the proposed rule issued by EPA regarding standards for marine spark ignition engines.) Specifically, she expressed concerns about the proposed burden reduction for small business sterndrive and inboard (SD/I) engine manufacturers. She noted the agency has chosen not to utilize the size standards established by the Small Business Administration (SBA) for small business marine engine and equipment manufacturers of 1,000 and 500 employees respectively as a basis for providing small businesses with regulatory relief. Instead, the agency is setting a threshold at a production level of 5,000 engines per year. Although EPA is proposing to allow businesses that exceed the production level but fall within the SBA size standards to request treatment as small businesses, the uncertainty of this case-by-case approach causes concern. She commented that the proposed unit production threshold will not provide relief for the small businesses in this industry. The proposed rule requires a dramatic reengineering of SD/I engines and small businesses need relief so federal regulation will not place them at a competitive disadvantage to their larger counterparts.

Congresswoman Velazquez commented that it is important to consider that the disparity between large and small businesses in the SD/I market sector is significant. The leading large businesses in this sector have tens of thousands of employees. The smaller businesses in this sector have less than 100 employees; however, some of them may not be eligible for relief based on the proposed production level criteria. She noted that EPA has completed the Small Business Advocacy Review Panel process for this rulemaking and during that process the Agency invited small marine engine businesses to discuss the flexibilities they require so as not to be placed at a competitive disadvantage by the proposed rule. Based on these good faith discussions and the disparity between large and small companies in the SD/I market segment, she strongly urges the EPA to utilize SBA size standards as the basis of providing burden reduction for small businesses. She recommended that the final rule implement the 1,000 and 500 employee threshold as the basis for small business burden reduction rather than on a unit production level. She commented that if EPA continued to believe the threshold for providing small businesses with burden reduction should be based on an annual engine production level, EPA should advise the Committee of the necessity for this.

ECO commented that they agree that small businesses require additional lead time and flexibility to comply with the proposed rules. However, using the threshold 500 employees or 5,000 SD/I engines per year is overly inclusive, providing regulatory flexibility for entities that are not truly small businesses. This action, in turn, will cause harm to those companies that truly are small businesses. Instead of the current proposal, ECO and recommended that EPA consider adopting the definition proposed in 40 CFR 1048.801 for large spark-ignition engines, which identifies a small volume engine manufacturer as one with 200 or fewer employees, or less than 2,000 subject engines produced annually.

Tohatsu commented that it is quite a tough job for a small manufacturer like itself who has total employees of less than 500 people to redevelop and set calibration fuel, ignition timing, etc. and also comply with evaporation requirements. And naturally these changes will also require a new batch of deterioration testing at 350 hours for all models. Although Tohatsu understands that these requirements are necessary, they noted that it is a very time consuming, and expensive, process for a small company to meet. Tohatsu commented that the time frame should be extended as much as possible to give small manufacturers a realistic chance to comply with the new regulations. Unlike many of their competitors that have other divisions in cars and motorcycles, Tohatsu produces only outboards. Because of this, Tohatsu commented that it does not have the same resources to be able to comply with new regulations as quickly as other companies.

ECO commented that the proposed provisions for small volume engine manufacturers to rely on assigned deterioration factors for demonstrating useful life emissions compliance (ref 40 CFR 1045.240(c)) are critical to the small businesses which produce SD/I engines. ECO encouraged EPA to retain this provision in the final rule.

Letters:

Commenter	Document #
NMMA	0688
Indmar	0667
Ilmor	0658
Pleasurecraft Marine (hearing)	0642
Marine Power (hearing)	0642
Congresswoman Velazquez	0702
ECO	0712
Tohatsu (hearing)	0642

Our Response:

With regard to the comments on use of a small-volume threshold to provide SD/I engines manufacturers with regulatory flexibility, EPA had additional discussions with NMMA on this issue after the close of the comment period. ("November 19, 2007 Meeting with National Marine Manufacturers Association" EPA memo from Alan Stout to Docket EPA-HQ-OAR-2004-0008, November 20, 2007. See docket item EPA-HQ-OAR-2004-0008-0757.) NMMA continued to support using a business's number of employees rather than production volume as a basis for determining eligibility for regulatory relief. EPA notes that the SBA's size standards at 13 CFR part 121 define small businesses as those that have 1,000 employees or less (for NAICS code of 333618), not 500 employees or less as cited by NMMA in its comments. EPA's concern with using the NMMA's recommended employee cut-off level for marine engine manufacturers as the primary criteria for determining eligibility for the rule's hardship provisions is that manufacturers with such high numbers of employees generally should have ample resources to devote to complying with EPA's program, and it would therefore be unnecessary to provide regulatory relief for such manufacturers. In addition, manufacturers with around 1,000 employees would easily be able to produce significantly more than the 5,000 unit limit included in the proposed definition. Based on current employment levels for the biggest of the existing small business SD/I engine manufacturers, EPA believes it is possible to use an employee limit of 250 for the small-volume engine manufacturer definition and still include all small businesses as defined under SBA definition. EPA believes a 250 employee limit should be roughly consistent with the production level we targeted in our proposal, although some manufacturers would likely be able to produce more than 5,000 units. Therefore, EPA is adopting a small-volume engine manufacturer definition of 250 employees or less for the final rule. Under the small-volume engine manufacturer definition being adopted, there will be no option to consider the production volume instead of the 250 employee count.

All of the small business SD/I engine manufacturers identified by EPA have significantly fewer employees than the small business size standard established by SBA. As noted above, EPA believes that a business with close to 1,000 employees should have the resources available to comply with the new requirement without the need for the flexibilities proposed for small volume SD/I engine manufacturers. For this reason, we are adopting a 250 employee limit. EPA believes this limit will cover all of the existing small business SD/I engine manufacturers (as defined by SBA), but places a reasonable limit on how large a company could grow before they are no longer eligible for EPA's flexibilities for small volume engine manufacturers.

EPA has the authority and discretion to select the criteria for determining which "small" manufacturers are eligible for the flexibilities being offered under a regulatory program. EPA's selection of eligibility criteria for purposes of establishing regulatory thresholds is not governed by the Regulatory Flexibility Act (RFA) as amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA). The RFA is a purely procedural statute. *United States Cellular v. Federal Communications Comm'n*, 254 F.3d 78 (D.C. Cir. 2001). Under the RFA, EPA is required to use SBA's size standards to define "small businesses" for purposes of complying with the RFA's requirements, unless it adopts an alternative definition. EPA used the SBA definitions for purposes of its compliance with the requirements of the RFA, including for the identification of Small Entity Representatives (SERs) for the Small Business Advocacy Review Panel convened pursuant to section 609(b) of the RFA and for analyzing the impacts of the proposed rule on small businesses in the Initial Regulatory Flexibility Analysis (IRFA) which was included in Chapter 10 of the Draft RIA.

EPA believes that its adoption of flexibilities for small-volume manufacturers does not amount to establishing a size standard for a "small business concern." The regulatory flexibilities simply identify options available to manufacturers to aid in the transition to new emission standards. Even if EPA's adoption of these regulatory flexibilities could be characterized as a size standard, EPA shared this approach during the SBREFA Panel process and provided SERs with the criteria we ultimately proposed. Additionally, EPA's proposal included flexibility eligibility criteria based on the annual production volume, but also included the option to request treatment as a small-volume engine manufacturer if they demonstrated they met the SBA size standards. Finally, SBA is part of the inter-agency review process and has reviewed and cleared the final rulemaking package.

For OB/PWC engines, EPA is also revising the definition of small volume engine manufacturer. EPA originally proposed a definition based on a production level of 5,000 units per year. The revised definition is the same as that being adopted for small volume SD/I engine manufacturers noted above and is based on number of employees rather than production. EPA believes a 250 employee limit should be roughly consistent with the 5,000 unit production level we targeted in our proposal. To qualify for the flexibilities for small volume OB/PWC engine manufacturers, a manufacturer would need to have no more than 250 employees.

With respect to Tohatsu's comments on additional time for small OB/PWC engine manufacturers to meet the exhaust standards, it can be noted that EPA is delaying implementation of the standards for all OB/PWC engine manufacturers. EPA is delaying the exhaust standards for OB/PWC engines from 2009 to 2010. Tohatsu had nine OB/PWC engine families certified with EPA in the 2007 model year. Of these nine families, four of them have Family Emission Levels (FELs) below the new HC+NOx standards. In addition, all of the engine families have CO levels below the new CO standards, although three of the families are close to the standard. Given that we will continue the ABT program for HC+NOx, given that we will allow averaging for CO emissions, and given the extra year of leadtime, we believe Tohatsu (and other small volume OB/PWC engine manufacturers) should have sufficient time to comply with the new exhaust emission standards by 2010. (See Section 4.10 of this document for further discussion of Tohatsu's comment with regard to the evaporative emission standards for Marine SI engines and vessels.)

With regard to the comment on the use of assigned DFs for small volume engine manufacturers, EPA is retaining the provision for the final rule as proposed.

4 Evaporative Emission Standards and Related Requirements for Nonroad SI Engines and Equipment

What We Proposed:

The comments in this section generally correspond to Sections VI and VII of the preamble to the proposed rule, where we describe the proposed emission standards and certification procedures associated with evaporative emissions from Small SI equipment and Marine SI vessels. The applicable regulatory provisions for these proposed requirements are in 40 CFR parts 90, 1045, 1054, and 1060. The Regulatory Impact Analysis describes the feasibility of these standards, special provisions that apply to small businesses, and alternative standards under consideration in Chapters 5, 10, and 11, respectively.

See Chapter 1 of this document for a discussion of issues related to Large SI engines and equipment and to recreational vehicles.

4.1 General approach

4.1.1 Support proposed standards

What Commenters Said:

EMA supported the basic evaporative standard requirements proposed by EPA. EMA specifically requested that EPA make additional efforts to harmonize test methods with the California ARB Tier III requirements. Harmonizing soak temperatures, tolerances, measurement methods, and reporting requirements would substantially reduce regulatory burden without reducing environmental benefit.

California ARB recommended that EPA either modify its proposal to match the California program or allow California test results to meet the EPA requirements.

NACAA supported EPA's inclusion of evaporative emission standards for all nonroad spark-ignition equipment and watercraft covered by this rule. NACAA noted that it is pleased that EPA has proposed fuel line controls in 2008 for Class I and II small spark-ignition engines and tank permeation, diffusion and running loss standards, as well. Likewise, for marine spark-ignition engines, NACAA supported the evaporative emission standards included in the proposal and encouraged EPA to implement these standards on the schedule identified.

Pennsylvania DEP supported the proposed standards and implementation schedule for marine spark-ignition engines and vessels. MARC AQ Forum supported the evaporative emissions standards included in this proposed rule for non-road spark ignition and marine engines.

NESCAUM supported EPA's effort to harmonize the federal emissions standards with those standards already adopted in California. However, NESCAUM commented that the effective dates for the evaporative emissions standards should be sooner and should match the effective dates of the comparable California standards or follow California by no more than one year.

Environmental Defense applauded EPA's proposal to establish for the first time evaporative emission standards for spark-ignition marine and small engines. Reducing the vaporous air toxics and other pollutants emitted from SI engines will greatly reduce the inhalation based cancer and non-cancer health risks posed from these sources. Environmental Defense commented that they believe all types of evaporative emissions should be reduced from all sources.

Delphi generally supported the proposed evaporative emission requirements for nonroad SI engines and equipment.

Trident Rubber commented that it agreed with and supported most of the EPA's proposal to control evaporative and exhaust emissions from SI engines and fuel systems on boats. They particularly supported the proposed provisions related to low permeation marine fuel line hose and assemblies.

Letters:

Commenter	Document #
NACAA	0651
Environmental Defense	0648
NESCAUM	0641
MARC AQ Forum	0696
California ARB	0682
Delphi	0638
Trident Rubber	0636
Pennsylvania DEP	0676
EMA	0691

Our Response:

We are largely finalizing the evaporative emission standards as proposed. In several cases we adjusted regulatory provisions in response to public comments. Some of the changes in the final rule are based on new information since the proposal was published. These modifications are discussed, in the appropriate sections, throughout this chapter.

Several issues have been raised by commenters related to the harmonization of federal and California standards, test procedures, and other requirements. These comments are addressed throughout this chapter. Although California has evaporative emission standards for Small SI equipment, it should be noted that California has not yet established evaporative emission standards for marine vessels.

4.1.2 Applicability and general concerns

What Commenters Said:

EMA commented that engines utilized for auxiliary power in highway products should be specifically excluded from §1060.1. For example, generators for motor homes where the fuel is supplied from the main vehicle fuel tank should not be covered by the proposed rule. If EPA does not exclude such engines/equipment from the final rule, EMA commented that the only requirement that should apply is the requirement that addresses the fuel line used to connect the engine to the vehicle fuel tank. Further, if such engines/equipment are not excluded, EMA commented that EPA must clarify that vehicle manufacturers producing equipment that utilize such engines are not required to certify to the Small SI engine related provisions.

EMA noted that §1060.5(e)(3) refers the engine manufacturer to 40 CFR Part 1054, and Part 1054 refers back to Part 1060. EMA commented that these circular references are confusing and unnecessary. In order to provide a clear and concise regulatory scheme, all evaporative requirements should be included in Part 1060.

NMMA commented that NMMA members have only a few remaining concerns regarding the technology required by the proposal. Catalysts, carbon canisters, and low permeation hoses are available and can be incorporated into marine exhaust and fuel systems. However, what does concern NMMA and its members is that these components are not necessarily at the point at which they are either commercially available or tested sufficiently in the field to assure boating safety or consumer choice. To address these concerns, NMMA recommends additional lead time for the implementation of certain aspects of the exhaust and evaporative emission standards or a phase-in approach. As NMMA testified to at the public hearing, there are 3,000 boat builders in the U.S.; only 400 of these are NMMA members. For the remaining boat builders, they cannot say with any certainty whether these businesses are even aware of this rulemaking. Thus, they cannot stress enough the importance of EPA giving sufficient lead time for compliance to assure that the Agency has the opportunity to perform the necessary outreach and education to ensure that small businesses are aware of the rule requirements and understand the regulatory compliance obligations.

Letters:

Commenter	Document #
EMA	0691
NMMA	0688

Our Response:

The proposed rule included language in §1054.20 to specifically state that the new Small SI evaporative requirements do not apply to engines used for auxiliary power on motor vehicles (or marine vessels). We agree that this is necessary to avoid overlapping or conflicting requirements where these fuel systems could already be subject to other standards. We would still expect engine manufacturers to use fuel tanks and fuel lines that meet Small SI standards to the extent they install these components and are unsure that the engines will be installed in motor vehicles (or marine vessels). We have added language to §1060.1 to further clarify the applicability of standards for these products.

The regulatory approach for our nonroad evaporative standards is to include in part 1060 everything that one would need to know for meeting applicable requirements. This is especially designed to allow component manufacturers to have all applicable requirements included on one location as much as possible. In some cases, this involves a reference to an exhaust standard-setting part such as part 1054 for detailed provisions that apply uniquely for a particular category of engines. The most prominent example of this is related to emission credits. Provisions for emission credits apply only for equipment manufacturers (not component manufacturers) and emission credits are generally not exchangeable across engine categories, so these are not included in part 1060. We include a summary of the evaporative emission standards in the exhaust standard-setting parts to accommodate a similar interest for engine manufacturers to have ready access to a description of what standards apply for their products. EPA and manufacturers will gain much experience in the coming years regarding the certification practices. We will be ready to help people understand their compliance obligations and may revise the regulations in the future to avoid confusion if it becomes clear that certain changes are needed.

We address NMMA's concerns about lead time for the various requirements in the following sections. We agree that we will need to make an extensive effort to help boat builders and others understand the new requirements and look forward to working with NMMA toward that end.

4.2 Small SI standards and lead time

4.2.1 Components covered

What Commenters Said:

EMA and OPEI supported EPA's proposed requirement that fuel line permeation standards apply only to liquid fuel lines. EMA and OPEI noted that EPA's own data confirms the fact that permeation emissions from vapor lines and very small surface area components (such as primer bulbs) do not require controls. EMA and OPEI suggested that vapor lines and filler necks that may be in constant contact with liquid fuel should be held to the same permeation requirement as other fuel lines. However, filler neck and tank assemblies that include features to limit the possibility of liquid fuel being in constant contact with the filler neck (e.g. overfill valves, venting arrangements, and filler necks above the maximum fuel level in the tank) should be considered vent line and should not be subjected to permeation requirements.

EMA also commented that the proposed language in §90.3 includes a definition of "Fuel Line" pursuant to 40 CFR Part 1054.801. EMA commented that the proposed wording in §90.127(a)(1) could be confusing and should be revised to reference the proposed fuel line definition. Accordingly, §90.127(a)(1) should be revised to read as follows: "... This standard applies to any fuel line."

Honda requested that EPA allow engines less than 80cc to comply with both handheld exhaust and evaporative emission standards. Honda agreed with the proposal as written that engines less than 80cc should be handheld and asked that the language on evaporative emissions be clarified to include these engines.

Letters:

Commenter	Document #
EMA	0691
OPEI	0675
Honda	0705

Our Response:

The new standards will apply to fuel lines, including hose or tubing that contains liquid fuel. This includes fuel supply lines but not vapor lines or vent lines that are not normally exposed to liquid fuel (see the definition of "fuel line" in §1054.801). We consider fuel return lines for handheld engines to be vapor lines, not fuel lines. Data in Chapter 5 of the Final RIA suggest that permeation rates through vapor lines and vent lines are already lower than the new standard; this is due to the low vapor concentration in the vapor line. In contrast, permeation rates for materials that are consistently exposed to saturated fuel vapor are generally considered to be about the same as that for liquid fuel. The new standards also do not apply to primer bulbs exposed to liquid fuel only for priming, but would apply to primer bulbs directly in the fuel supply line. For comparison, this standard will apply to marine filler necks that are filled or partially filled with liquid fuel after a refueling event where the operator fills the tank as full as possible. In the case where the fuel system is designed to prevent liquid fuel from standing in the fill neck, the fill neck will be considered a vapor line and not subject to the new fuel line permeation standard (see Section 4.3.2).

We agree with EMA that the language at the end of §90.127(a)(1) is duplicative because it is included in the definition of "fuel line" and have modified the text to specify "any fuel line."

We have clarified the regulations stating that all Small SI engines at or below 80cc may certify to the handheld evaporative standards, regardless of the type of application into which the engine is ultimately placed.

4.2.2 Fuel line permeation standards and lead time

What Commenters Said:

EMA commented that the final regulation will not be implemented in time for manufacturers to incorporate the fuel line requirements for nonhandheld engines into 2008 model year engines. However, EMA member companies, and a significant percentage of equipment manufacturers that utilize EMA member company engines, will use low permeation fuel lines on a voluntary basis during the 2008 model year (which will provide substantial environmental benefits). Due to the negative lead time associated with the implementation of the final rule, EMA commented that EPA must provide the flexibility necessitated by the situation. Engine manufacturers can't be required to comply with retroactive standards that have not yet been implemented.

Honda also requested that EPA recognize that the requirement for compliance in 2008 with certain provisions may not be feasible for 100 percent of engines or products. Section 90.127(a) and (b)(1) requires demonstration of compliance with fuel line permeation from nonhandheld engines and equipment for the 2008 model year. In some cases, manufacturers may produce both California and 49-state compliant product for 2008, therefore compliance with this proposed requirement would not be feasible. Honda suggested that 2009 should apply to all engine and equipment manufacturers, not just small volume producers.

OPEI commented that due to the expected effective date of the final rule and the imminent date of the engine manufacturer's 2008 model year, it is more than likely that the final rule will provide negative lead time for implementation of the fuel line permeation standards for nonhandheld products. As a result, OPEI commented that certification of compliance with such standards is not feasible and the regulatory requirements must be delayed until the 2009 model year. While OPEI member companies, and a significant percentage of equipment manufacturers that utilize OPEI member company engines, will use low permeation fuel lines on a voluntary basis during the 2008 model year (which will provide substantial environmental benefits), OPEI commented that EPA must nonetheless delay the effective date of such regulations.

OPEI supported EPA’s reasoning for the given timing for implementing low permeation fuel lines on handheld products. Manufacturers need sufficient lead-time to safely design, select, manufacture, test and implement these new lines.

California ARB noted that EPA has proposed a fuel line permeation standard of 15 g/m^2/day that is the same as those for recreational vehicles. The small off-road engine/equipment program has implemented this standard since 2006. California ARB commented that its component certification data for fuel hoses (included in Attachment 1 of California ARB’s comments) supports setting a lower standard. Therefore California ARB recommended a more stringent standard of 5 g/m^2/day at 40°C.

NACAA commented that they are pleased EPA has proposed fuel line controls in 2008 for Class I and II small spark-ignition engines.

Environmental Defense commented that they support EPA’s [fuel line permeation] standard for Small SI engines as it is identical to California’s. They also supported EPA’s near-term implementation dates of 2008 and 2009. As EPA recognizes, California currently requires the use of a low-permeation fuel line in Small SI equipment such as walk-behind lawn-mowers. Manufacturers of fuel lines used in SI small equipment will be able to draw from readily available technology used to meet the CA standard. NACAA commented that they believe a lead time of two years provides the manufacturers ample time in which to design fuel lines that will meet the proposed standard and would strongly oppose the adoption of any later implementation date. Indeed, we would like to see evaporative emission standards for all types and classes of SI small and marine engines implemented in the shortest time period feasible.

Briggs and Stratton commented that the proposed fuel tank and fuel line permeation levels are acceptable.

Letters:

Commenter	Document #
OPEI	0675
Environmental Defense	0648
Suzuki	0698
California ARB	0682
Briggs and Stratton	0657
EMA	0691
Honda	0705

Our Response:

We are finalizing the proposed fuel line standard of 15 g/m^2/day for Small SI equipment. This permeation rate is at 23°C on a test fuel containing 10 percent ethanol. This hose permeation standard is consistent with the existing recreational vehicle standard and the new standard for marine vessels being finalized in this rule. The move toward low-permeation fuel lines in recreational vehicles—and further development work in this area since the first proposed rule for marine evaporative emissions—demonstrates that low-permeation fuel lines are available on the market today for Small SI equipment. In addition, many manufacturers are already using low-permeation technologies in response to permeation standards in California. However, we recognize that this rule has not been finalized until well into 2008. We are therefore requiring that the hose permeation standard apply beginning January 1, 2009 for nonhandheld Small SI equipment.

4.2.3 Fuel line permeation– cold-weather fuel lines

What Commenters Said:

OPEI commented that low-permeation fuel lines should not be used on cold weather products (like chainsaws and ice augers) because the stiffer lines would be much more likely to crack and break during high-vibration uses (such as chainsaws) at cold temperatures. Accordingly, OPEI strongly urged EPA to finalize the proposed, more appropriate permeation standards and related effective dates for fuel line used on cold-weather, handheld products. Lines with permeation levels at 175 grams should provide the needed mechanical flexibility in material to comply. Because manufacturers must use lines with perm levels at about 175 g/m^2/day, using ABT to offset the credits needed if the standard on these product types was 15 g/m^2/day, would not be possible.

OPEI commented that the products outlined in the definition of cold weather provided for in part 1060 are acceptable and necessary for safety reasons. All of the indicated products are used in extremely cold environments.

After the comment period closed, OPEI commented that the data they had submitted on handheld product fuel line permeation rates, prior to the NPRM, was based on a test fuel of 90 percent gasoline and 10 percent ethanol (E10). However, the proposed fuel line permeation standards were based on fuel CE10,[1] which results in significantly higher permeation rates. Further, OPEI provided additional test data on permeation rates from cold weather fuel lines tested on either E10, CE10, or both test fuels.[2] Based on this test data, OPEI recommended that the permeation standard for cold-weather fuel lines be 290 g/m^2/day with E10 as a test fuel. OPEI stated that the higher permeation limit was necessary to account for high variability in the test results. They further commented that a standard of 225 g/m^2/day would be possible if coupled with an averaging program.

Letters:

Commenter	Document #
OPEI	0675
OPEI	0811

Our Response:

Handheld equipment manufacturers have raised concerns that fuel lines constructed of available low-permeation materials may not perform well in some handheld applications under extreme cold weather conditions such as below -30°C. These products often use injected molded fuel lines with complex shapes and designs needed to address the unique equipment packaging issues and the high vibration and random movement of the fuel lines within the overall equipment when in use. Industry has expressed concern and the data in Chapter 5 of the Final RIA suggest that durability issues may occur from using certain low-permeation materials in these applications when the weather is extremely cold and that these could lead to unexpected fuel line leaks. Handheld equipment types that could be considered as cold-weather products include cut-off saws, clearing saws, brush cutters over 40cc, commercial earth and wood drills, ice augers, and chainsaws.

As discussed in the Final RIA, rubbers with high acrylonitrile (ACN) content are used in some handheld applications. These materials have about half the permeation of lower ACN-content rubbers also used in handheld applications. To capture the capability of these materials to reduce permeation emissions without creating other issues for cold weather products, we are adopting a set of declining fuel line permeation standards for cold-weather products that would phase in from 2012 to 2016. The standard for cold-weather products starts at 290 g/m^2/day in 2012 and decline to 275 g/m^2/day in 2013, 260 g/m^2/day in 2014, 245 g/m^2/day in 2015. The standard for 2016 and later model years is 225 g/m^2/day. The standards would apply to all cold-weather products, including small volume families. Manufacturers would be allowed to demonstrate compliance with the 2012 through 2015 standards with a fuel line averaging program for cold-weather products. Beginning in 2016, fuel line averaging would no longer be available for cold-weather products and all fuel lines on cold-weather products would have to comply with the 225 g/m^2/day standard. These standards are based on testing with E10 test fuel (not CE10), consistent with the data used to establish the emission standards. For any future emission standards for cold-weather fuel lines, we would consider aligning fuel specifications (and emission levels) with those established for other fuel lines.

[1] Fuel CE10 denotes 90% ASTM Fuel C (50% isooctane, 50% toluene) and 10% ethanol
[2] "Discussions with Handheld Manufacturers on Cold-Weather Fuel Lines," EPA memo from Phil Carlson to Docket OAR-2004-0008, May 30, 2008.

4.2.4 Tank permeation standards and lead time

What Commenters Said:

Environmental Defense stated that it supports the proposed fuel tank permeation standards as they are consistent with the California standards. Environmental Defense recommended earlier implementation dates for the tank permeation standards. They commented that an earlier implementation date of 2008, rather than 2009, is feasible for those handheld equipment manufacturers currently using low-permeation fuel tanks in products sold in California. They also requested that the tank permeation implementation dates for other handheld equipment manufacturers be moved up by at least a year. Environmental Defense also argued that the implementation dates for fuel tanks on nonhandheld equipment are too delayed. Environmental Defense commented that coordinating tank permeation implementation dates with SI small engine exhaust implementation dates is unnecessary. First, they noted that they object to the much delayed implementation dates for the engine exhaust standards and do not believe EPA has adequately explained the basis for the proposed long lead times. Second, they see no reason why the implementation timetable for evaporative controls must be tied to that for exhaust controls because EPA nowhere states that newer low-permeation fuel tanks used to reduce evaporative emissions cannot be combined with advanced fuel injection technology or catalysts used to reduce exhaust emissions.

The California Air Resources Board expressed support of fuel tank permeation standards but stated that the standard of 1.5 $g/m^2/day$ should be based on testing on CE10 at 40°C rather than at 28°C. California ARB commented that component certification data from the small off-road engine program in California supports setting a lower standard. California ARB also commented that the phased-in schedule to meet the fuel tank permeation standards is too lengthy and that two years is sufficient time to allow manufacturers to design and produce equipment meeting the new evaporative standards. California ARB pointed out that the control technology is readily available and currently used in lawn and garden equipment in California.

Arkema commented that it supplies PetroSeal technology and is eager to work with tank manufacturers to help them meet the tank permeation standards. This technology is a two-layer fuel tank. The inner layer is Rilsan Polamide 11, which is an engineered polymer which may be used to create a permeation barrier in rotation-molded fuel tanks. Arkema stated that this specialty nylon, which is used in automotive fuel lines, gives excellent resistance to fuel permeation, and is a tough, impact-resistant polymer. Arkema commented that this material is dimensionally stable, molds very easily and is manufactured from a renewable resource (100 percent bio based from a vegetable oil). In a low-permeation, roto-molded fuel tank, the the outer side of the layer is metallized polyethylene which has an excellent resistance to alcohol permeation and molds very easily. The inner layer is the PA11 which is designed to adhere with the outer layer to ensure the structural integrity of the tank and to ensure minimal permeation. As a result, Arkema concludes that tanks manufactured with PetroSeal are very low permeation, very tough and cost-effective.

Arkema commented that the PetroSeal technology meets current EPA permeation regulations as tested by EPA laboratories (see the RIA) and has received a California ARB exemption for the small off road and recreational vehicle tanks. Arkema also stated that the tanks using this construction have been demonstrated to meet US Coast Guard requirements for mechanical strength and fire resistance for permanently installed marine fueled tanks. Arkema had a ten gallon and 40 gallon fuel tank manufactured and tested by Imanna labs. In addition, a lawn and garden fuel tank using this technology passed the SAE J288 snowmobile impact test. Arkema commented that PetroSeal is a commercially active technology today and they are selling this material for use in motorcycle fuel tanks.

Solar Plastics commented that they have conducted an active research and development effort for many years and that numerous tooling, material, and processing concepts have been invented, evaluated, or optimized in their test facility. Solar has been working with Arkema and now produces multi-layer rotation-molded fuel tanks. Solar Plastics commented that it has established safe, reliable, and consistent processes to mold the two layer PetroSeal material system. Solar asserted that these molded tanks exhibit excellent adhesion between layers, impact strength that meets various industry standards, and permeation resistance well within proposed standards. PetroSeal fuel tanks molded by Solar Plastics satisfy durability requirements adopted by the marine, and lawn and garden equipment industries. These include ambient and cold temperature impacts, and burn tests. Molding methods are cost efficient, and utilize the same tooling and machinery that produce single layer tanks. Based on these considerations, Solar Plastics concluded that technology is available today to rotation-mold fuel tanks that meet the proposed evaporative emissions standards.

Centro commented that, in anticipation of low permeation requirements for fuel tanks for Small SI equipment and for boats, they have worked hard over the last five years to develop a solution that meets all requirements. Centro stated that they have a solution that is as durable as current rotation-molded tanks and meets all other criteria. Centro commented that they have invested hundreds of thousands of dollars in successfully developing and testing this technology, and that it would be a disservice to the environment to delay tank permeation standards.

Briggs & Stratton commented that they find the proposed fuel tank and fuel line permeation levels to be acceptable. OPEI commented that the effective dates for fuel tank standards on handheld tanks are very aggressive (phase-in begins in 2009) and that this will require accelerated development and negotiation with production sources. OPEI stated that it accepts the aggressive effective dates.

EMA, OPEI and Briggs & Stratton commented that the proposed alternative fuel tank standard of 2.5 $g/m^2/day$ standard at 40°C is not supported by theory or literature to be equivalent to the 1.5 $g/m^2/day$ standard at 25°C. They stated that the alternative standard should be changed to 3.0 $g/m^2/day$ at 40°C. OPEI and Briggs & Stratton commented that, for handheld structurally integrated tanks, the 40°C requirement should be 5.0 $g/m^2/day$. California ARB commented that the alternative of 2.5 $g/m^2/day$ at 40°C suggested by U.S. EPA should not be an option because this standard is too lenient based on certification data which supports a tougher standard.

OPEI submitted an additional comment after the close of the comment period regarding rotation-molded fuel tanks. They supported a delay in the permeation requirements for rotation-molded fuel tanks instead of allowing a certain number of noncompliant tanks in coordination with the Transition Program for Equipment Manufacturers.

Letters:

Commenter	Document #
OPEI	0675
Environmental Defense	0648
California ARB	0682
Briggs and Stratton	0657
EMA	0691
Arkema (hearing)	0642
Solar Plastics (hearing)	0642
Centro	0737
OPEI	0793

Our Response:

During the development of the proposed rule, we worked closely with the fuel tank industry to understand their products, business practices, and production processes. Information gathered from these interactions was used to craft the proposed regulatory provisions related to controlling gasoline fuel tank permeation emissions. During these discussions, important issues were identified with respect to concerns regarding the timing and technical feasibility of controlling permeation emissions from fuel tanks on Small SI equipment. We have concluded that the final fuel permeation standards are technologically feasible and appropriate for Small SI fuel tanks. This conclusion is supported by data presented in the Regulatory Impact Analysis by comments from fuel tank manufacturers. Issues specific to rotation-molded fuel tanks are discussed, in more detail, under Section 4.3.5.

We are finalizing the fuel tank permeation implementation dates as proposed. In response to comments requesting an earlier implementation date, given the timing of this final rule, an implementation date of 2008 is clearly not feasible, even for fuel tanks already certified in California. We also do not believe that the standards for other fuel tanks should be pulled ahead, relative to the proposal. Our final implementation dates are based on our best estimate of how much lead time is necessary to bring low permeation fuel tanks to production, especially given the large number of fuel tank manufacturers that are small businesses. We considered that some manufacturers may be capable of bringing part of their product line in compliance with the fuel tank permeation standards early. In order to provide an incentive for these early reductions, we finalized an early credit program.

We are finalizing the optional alternative standard of 2.5 g/m^2/day at 40°C as proposed. This alternative standard is intended to provide flexibility to manufacturers that wish to perform a single permeation test for certification to EPA standards and for use in certifying to the California ARB Small SI standards. The intent of the higher limit of 2.5 g/m^2/day is to account for increased permeation rates at elevated temperature. This increased limit is not intended to represent how an average tank may perform, but rather to provide reasonable assurance that a tank certified at the higher temperature would pass the primary standard of 1.5 g/m^2/day at 28°C.

This adjusted standard at 40°C is based on data presented in the RIA and is intended to account for variability in how different materials will respond to increases in temperature.

We respond to OPEI's comment related to lead time for rotation-molded fuel tanks in Section 2.7.6.

4.2.5 Tank permeation– structurally integrated fuel tanks

What Commenters Said:

OPEI expressed support for EPA's proposed permeation standards and flexibilities for "structurally integrated" fuel tanks, which are also subject to unique production and operating conditions, including cold-weather and high vibration. They commented that the flexibilities EPA has provided for, while challenging in terms of permeation reduction, should allow manufacturers to engineer safe, practical and cost effective solutions.

Environmental Defense objected to the fuel tank permeation standard proposed for structurally integrated fuel tanks on handheld equipment stating that it was too lax. They noted that California's standard requires fuel tanks to emit no more than 2.0 grams per square meter per day and that EPA's proposed standard of 2.5 grams per square meter per day falls short of this standard by a factor of 25%. Environmental Defense commented that the California ARB standards represent an essential benchmark necessary to protect human health and that therefore the federal standards should be at least as stringent. They also requested that the implementation dates for structurally integrated fuel tanks be moved up by at least a year to 2010.

Letters:

Commenter	Document #
OPEI	0675

Our Response:

We tested structurally integrated fuel tanks from four handheld equipment manufacturers at 29°C on both gasoline and s 10 percent ethanol blend. The test results, which are presented in Chapter 5 of the RIA, suggest that structurally integrated fuel tanks are capable of meeting the standards using their current materials. In the cases where the permeation rates were higher than the standards, it was observed that the fuel cap seals had large exposed surface areas on the O-rings, which were not made of low permeation materials. Further data was collected by the handheld equipment industry after the proposal. In this testing, they investigated the effect of fuel type and gasket material on the permeation results. These test results suggested that permeation can be reduced significantly by using a low permeation material, such as FKM, for the seal on the fuel cap. In addition, data on aged tanks suggested that NBR o-rings may deteriorate in-use such that the permeation rate (or vapor leak rate) through the seal increases greatly. Based on this test data, we are finalizing a more stringent fuel tank permeation standard of 1.5 g/m^2/day for structurally integrated fuel tanks. However, we are retaining the 2011 implementation date in the proposal to give manufacturers sufficient time to address any design changes, especially for fuel cap seals, that may be necessary.

Manufacturers have expressed concerns with the long term durability of known low-permeation elastomers in cold-weather applications. At the same time, manufacturers have commented that existing fuel cap gasket/o-ring materials may degrade in the field after one year (depending on weather and fuel type) in such a way as to have excessively high permeation rates, but still prevent liquid fuel leaks. To address this issue, we are allowing manufacturers to treat fuel cap seals, on cold-weather equipment, as allowable maintenance items that should be replaced annually. In the case of an in-use evaluation, any elastomeric fuel cap seal, over one year old, on cold-weather handheld equipment would be replaced prior to preconditioning the tank for permeation testing if the manufacturer specified this scheduled maintenance for the fuel cap. At the same time, it is not certain that low-permeation materials will deteriorate when used for fuel cap seals in cold-weather products. We intend to perform testing on fuel cap seals to determine the appropriateness of allowing manufacturers to specify scheduled maintenance to address these concerns. In the event that durable materials are identified, we may remove the provision allowing for this scheduled maintenance for purposes of compliance with fuel tank permeation standards.

4.2.6 Tank permeation– fuel caps

What Commenters Said:

EMA, OPEI and Briggs & Stratton commented that EPA should not impose separate and additional regulation (beyond CARB) of fuel cap permeation under the final Phase 3 rule. They argued that the emission contributions for fuel caps are very small compared to the overall fuel tank-control achieved. EMA and Briggs & Stratton commented that the permeation contributions of the caps may be accurately estimated to range from 0.021 and 0.086 g/day, for a typical Class I engine and the largest Class II engines, respectively, at 40°C. This estimate assumed that fuel caps are made of untreated HDPE (~14 g/m^2/day), though they commented that most fuel caps are made of lower permeating materials.

EMA and OPEI commented that engine and equipment manufacturers that certify products to the CARB standards already will have significant tank permeation testing data that does not include the fuel tank cap. Due to the difficulties involved with stabilization of the tank and the integrity testing requirements, they commented that such fuel tank permeation testing requires a substantial investment of time and effort on the part of the manufacturer. They concluded that the additional testing requirements would be unduly burdensome with diminished environmental benefits.

If fuel cap testing is absolutely deemed necessary, OPEI believes that allowing fuel caps to be tested separately from fuel tanks for permeation emission adds flexibility with no degradation to the environment. A single fuel cap may be used on several different fuel tank families. Fuel caps and fuel tanks may be molded by different manufacturers who then must submit the certification on their products and obtain the certificates of conformity.

OPEI noted that fuel tank caps can affect control of running loss emissions and/or diffusion emissions. Because fuel caps are generally produced by a different manufacturer than the fuel tank, OPEI argued that the proposed rule would require the fuel cap to be certified separately from the fuel tank. However, the engine or equipment manufacturer that is responsible for certification of the running loss and diffusion control requirements dictates the features associated with the fuel cap design. Accordingly, the fuel cap manufacturer would be responsible for certifying a product the design of which it does not control. In order to rectify this situation, OPEI recommended that either the engine or equipment manufacturer that is responsible for the compliance of the running loss and/or diffusion control requirements should simply include the fuel cap information within their certification documentation. Under any scenario, OPEI commented that EPA should not require fuel tanks to be tested and certified with a fuel cap. EMA commented that, if the final regulation does include a fuel tank cap certification and compliance requirement, compliance with such requirement should be the responsibility of the entity that is responsible for compliance with the running loss and/or diffusion control requirements.

Letters:

Commenter	Document #
OPEI	0675
Briggs and Stratton	0657
EMA	0691

Our Response:

We consider the fuel cap, when directly mounted on the fuel tank, to be part of the fuel tank. The fuel cap will therefore be included in the tank permeation standard and test. We understand that a given fuel cap may be used in several tank designs. In addition, the fuel cap may be constructed by a different manufacturer than the fuel tank. Therefore, we have included certification testing flexibility that will allow manufacturers to determine the best approach, for their individual business situations, to certifying their tanks and fuel caps to the permeation standard. These alternatives to testing the fuel tank with the cap in-place are listed below.

- The fuel cap manufacturers may test their caps and certify them separately to a separate 1.5 $g/m^2/day$ cap permeation standard. In this case, the fuel tank could be certified separately with a sealed opening, similar to the California ARB testing.

- Manufacturers may, optionally, test the cap separately from the tank and combine the results to determine the total tank permeation rate. This option would allow for fuel caps that do not meet the 1.5 $g/m^2/day$ standard, but would still make up a small enough part of the tank surface area such that the tank/cap combination would still comply with the permeation standard.

- The manufacturer may also opt to use a default permeation rate of 30 $g/m^2/day$. To be eligible for this default rate, the seal on the fuel cap must be made of a low-permeation material, such as a fluoroelastomer. The surface area associated with this default value is the cross sectional area of the opening that is sealed by the fuel cap. If this default value were used, the fuel fill would be sealed with a non-permeable plug during the tank permeation test, and the default permeation rate would be factored into the final result.

4.2.7 Running loss control

What Commenters Said:

The California Air Resources Boards supported control of running loss emissions from Small SI equipment, but recommended setting performance standards.

Environmental Defense expressed support for the proposed design-based approach to reduce running loss emissions from small engines. One of the options available to manufactures is the use of carbon canisters which are in use in California today. However, they urged EPA to adopt more immediate implementation dates. Environmental Defense argued that the proposal provides manufacturers ample flexibility in complying with the running loss standard as they may choose from four different design approaches and that this choice to utilize any of a range of evaporative control designs militates in favor of near-term implementation dates.

In contrast, EMA and OPEI commented that the running loss control requirement should be implemented at the same time as both the evaporative permeation control requirements and the exhaust emission requirements for nonhandheld equipment. OPEI commented that implementation of even the most basic running loss system would require a significant investment in terms of development and tooling. OPEI argued that EPA should not impose such requirements without adequate substantiation of effectiveness, function and safety. OPEI commented that EPA performed very little practical testing with running loss systems in place. In addition, OPEI stated that the significant challenges related to safety and function associated with these new control techniques (such as increased fuel tank pressure) are not addressed in the proposed rule's preamble or Impact Analysis. Running an engine or piece of equipment in a lab is very different from actual use conditions and OPEI contends that EPA has not adequately considered the costs and challenges associated with the proposed modifications.

OPEI further commented that the proposed rule specifically states that an actively purged canister would qualify as a means to reduce running loss; however, CARB has data that demonstrates that a passively purged canister also provides effective running loss control. EMA and OPEI requested that EPA broadly accept any system that utilizes an HC adsorption media in the fuel tank vent system as an acceptable running loss control system. EMA and OPEI also requested that products that meet the California ARB Tier 3 diurnal and running loss requirements automatically be deemed compliant with EPA's Phase 3 running loss regulations.

EMA commented that the proposed ability to demonstrate running loss control by compliance with the 8°C temperature rise requirement was based on very limited testing. EMA recommended increasing the maximum temperature rise to 10°C to meet the running loss requirement. EMA commented that the fuel tank bladder running loss control method lacks sufficient definition to meet the requirements of a clear and evenly applied standard and that additional refinement of this option is necessary. EMA also noted that options to control running loss through increased fuel tank pressures could be viable in some cases; however, they expressed concern that a large number of fuel tanks cannot utilize increased tank pressure as a control technology exclusively. As an example, EMA stated that many Small SI fuel tanks will change shape significantly at internal pressures less than 7 kPa resulting in fuel tank interference with moving parts in proximity of the tank.

OPEI commented that no running loss emissions standards are needed for handheld equipment. OPEI stated that, due to space, multi-position use, and weight constraints, the application of carbon canisters or other measures to reduce running losses from handheld equipment are not feasible.

Letters:

Commenter	Document #
OPEI	0675
Environmental Defense	0648
California ARB	0682
EMA	0691

Our Response:

We are establishing standards to control running loss emissions from nonhandheld Small SI equipment beginning in the same year as the Phase 3 exhaust emission standards—2012 for Class I engines and 2011 for Class II engines. Because the running loss control technology is integral to the fuel system, we believe it is appropriate to implement these standards in the same year as for the fuel tank permeation requirements. This will help minimize costs in that manufacturers will be able to transition to a single new fuel system design.

We have measured fuel temperatures from several Small SI equipment types and found that, in most cases, significant fuel heating occurred during engine operation. Emission tests were then performed on fuel tanks for this equipment by heating the fuel to the same temperature profile as was observed in-use. This testing, which is described in more detail in the RIA, support our finding that running loss emissions from Small SI equipment are significant.

There are several different design approaches that will reliably and effectively control running losses. However, it is very difficult to define a measurement procedure to consistently and accurately quantify running losses. Also, a performance standard with such a procedure introduces a challenging testing requirement for hundreds of small-volume equipment manufacturers. Moreover, we believe that the design approaches are straight-forward and can be clearly described and easily installed. We are therefore not controlling running losses using the conventional approach of establishing a procedure to measure running losses and adopting a corresponding emission standard. Manufacturers can choose from one of the following approaches to meet this requirement:

- Vent running loss fuel vapors from the fuel tank to the engine's intake manifold in a way that burns the fuel vapors in the engine instead of venting them to the atmosphere. The use of an actively purged carbon canister will qualify under this approach.
- Use a sealed fuel tank. A fuel bladder could be used to minimize fuel vapor volume in a sealed fuel tank without increasing tank pressure.
- Use a system with an approved executive order from the California Air Resources Board. An example of this would be a design in which a fuel cap is fitted with a small carbon canister and mounted on a tank that is not exposed to excessive engine heat.

With regard to bladder fuel tanks, this is offered only as one suggestion of a technology that could be used in conjunction with a sealed fuel tank as a strategy for minimizing pressure buildup in the tank. In a bladder fuel tank, the bladder collapses around the fuel, preventing the formation of fuel vapor and the associated pressure increase. Because this is simply an example of a technology that could be used with a sealed fuel tank, we do not believe that it is necessary to describe this technology in the regulations as suggested by EMA.

In the NPRM, we proposed another running loss design option whereby manufacturers could demonstrate, through testing, that the fuel temperature in the tank does not increase by more than 8°C during normal operation. Manufacturers commented that the temperature testing associated with this design option was too complex, the temperature limit was too low, and the associated diffusion requirements were infeasible. In later conversations, industry stated that they would not use the temperature design option, largely due to the complexity of the associated diffusion standards that would be necessary; therefore, we are not finalizing this option.

We are not applying the running loss requirements to handheld Small SI engines. We believe running loss emission standards should not apply to handheld engines at this time because the likely approach to controlling running losses could require that manufacturers revisit their design for controlling exhaust emissions. As described above, we are not changing the exhaust emission standards for handheld engines in this rulemaking. In addition, there are some technical challenges that will require further investigation. For example, the compact nature of the equipment makes it harder to isolate the fuel tank from the engine and the multi-positional nature of the operation may prevent a reliable means of venting fuel vapors into the intake manifold while the engine is running.

4.2.8 Diffusion

What Commenters Said:

Environmental Defense expressed support for standards to reduce diffusion emissions, stating that both performance and design based standards are effective in controlling evaporative emissions. However, they stated that implementation date for the diffusion standard was delayed to far into the future.

EMA, OPEI, and Briggs & Stratton commented that they do not support the inclusion of diffusion emission control in the final rulemaking. They argued that the testing performed to date over-estimates the diffusion emission contribution to total evaporative emissions, and that if tested in a manner more representative of the real in-use environment, it is unlikely that the diffusive emissions would be significant enough to warrant control. EMA offered the following specific comments on the diffusion testing performed by EPA: The conditions in the SHED enclosure are not representative of in-use conditions. Specifically, the air motion necessary to ensure good mixing and temperature control in the SHED enclosure causes higher emissions than actual in-use conditions. Most small engine equipment is stored in a quiescent atmosphere (shed or garage) in which concentration gradients are static and rarely disturbed. In a SHED enclosure, the required air motion disturbs the concentration gradient and amplifies the diffusive forces. Additionally, small variations in SHED enclosure temperature inherent to the temperature control systems will cause a diurnal action in the tank as the tank vapor space temperature changes. This cyclic temperature variation does not commonly occur in normal small engine storage. It is an artifact of the test method that tends to increase the measured emissions, but is not indicative of a true diffusion process. While the high fuel fill level in the proposed test method was included to counteract this diurnal effect, no testing was actually performed to determine if the fill level requirement had a significant effect on reducing the influence of the temperature fluctuation.

EMA, OPEI and Briggs & Stratton also argued that there is very little data to support the technical feasibility or impact of the 0.8 g/day requirement because the testing was performed on a small subset of fuel system configurations that did not adequately address the breadth of product variables or the inherent test-to-test variation. EMA and OPEI commented that, in the event diffusion is demonstrated to be a significant emissions factor, additional study is needed to develop reasonable requirements. If there is a need to control diffusion emissions independently, EMA and OPEI commented that a design standard approach would be more appropriate as quantification of diffusion emissions through a prescriptive test method would not significantly enhance the emission inventory reduction associated with the implementation of the regulation, but would significantly increase the cost of compliance.

Further, EMA and OPEI commented that the proposed control of running losses will substantially control the diffusion emissions and thereby making separate diffusion control requirements redundant and unnecessary. They recommended that EPA recognize the interaction between running loss control and diffusion control in either regulatory or preamble language in order to assure that actively controlled running loss systems, including those approved by the California ARB certification process, will provide sufficient diffusion control without requiring further demonstration.

OPEI also commented that the caps and tanks for handheld products should be exempt from the diffusion control requirements. Due to space, multi-position use, and weight constraints, OPEI argued that the application of carbon canisters or other measures to handheld products are not feasible, and that handheld engines and equipment already have a form of diffusion control since fuel tanks have no direct uncontrolled openings.

Letters:

Commenter	Document #
OPEI	0675
OPEI	0675
Environmental Defense	0648
Briggs and Stratton	0657
EMA	0691

Our Response:

We did not propose diffusion standards for handheld equipment. Handheld equipment uses fuel caps that are either sealed or have tortuous venting pathways to prevent fuel from spilling during operation. We believe these fuel cap designs limit diffusion emissions sufficiently so that we do not need to establish a diffusion standard for this equipment.

Similarly, we are not finalizing the proposed diffusion standards for nonhandheld Small SI equipment. We believe that the final running loss design standards will effectively control diffusion emissions because there will be no direct path for vapor to escape through diffusion. Under the proposed running loss standards, one of the design options for running loss emissions control was an open vent system with limits on fuel temperature increases during operation. Under that option, diffusion emissions could occur through the open vent. However, because this temperature-based option for running loss control is not included in the final standards, we believe that a separate diffusion standard would be redundant.

We disagree with the commenter's assessment of our characterization of diffusion emissions or of the testing performed to measure diffusion from Small SI equipment. The fuel tanks selected for the Small SI diffusion testing were from four high sales volume lawnmowers, representing a large share of Class I equipment sales. Testing was performed both in stock configurations and with a vent hose, such as may be expected in equipment with running loss emission control. Testing was also performed under variable temperature (diurnal) conditions and at constant temperature to quantify temperature effects. The proposed standard was based on actual test data, and therefore accounted for any temperature fluctuation or air mixing effects that may occur during testing. The results from this testing, which are described in more detail in Chapter 5 of the RIA, suggest that some common fuel cap designs result in an order of magnitude higher diffusion emissions than other common fuel cap designs.

4.2.9 Diurnal

What Commenters Said:

Several commenters stated that EPA should establish diurnal emission controls for small spark-ignition engines, noting that the California Air Resources Board has already done so. These commenters included NACAA, MARC AQ Forum, NESCAUM, and the Wisconson DNR. In addition, Environmental Defense noted that the California ARB rules provide manufacturers with a choice of either certifying to a performance or design standard that utilizes carbon canisters. They cited the preamble to the proposed rule in which EPA states that the use of passive purging carbon canisters "could reduce diurnal emissions by 50 to 60 percent" while active purging could produce even greater reductions. Environmental Defense argued that the national standards should be at least as stringent as those adopted by California and therefore objected to the omission of a diurnal standard for small engines from the proposed rules.

The California Air Resources Board recommended that a diurnal performance standard be set for the most representative small spark-ignition engines. Without a performance standard, California ARB argued that the U.S. EPA cannot validate emission reductions because a design-only standard cannot take into account connector losses, carburetor emissions, and leaks from poorly designed integrated engines. They commented that the diurnal standard should measure emissions from complete evaporative emission systems, be measured over three days (without a carbon canister) or seven days (with a carbon canister), and be based on tank volume, noting that his would be consistent with on-road vehicle test procedures. California ARB believes that two years is sufficient time for meeting the diurnal emission standards.

EMA and OPEI presented their opinion that the test data generated by EPA during the regulatory development process confirmed that Small SI equipment would not provide significant benefit from the addition of a diurnal standard requirement. They commented that the proposed combination of permeation control and running loss control will provide a significant reduction in evaporative emissions from these products, while providing the flexibility for each manufacturer to determine the most appropriate means to achieve these controls.

Letters:

Commenter	Document #
Wisconsin DNR	0663
OPEI	0675
NACAA	0651
Environmental Defense	0648
NESCAUM	0641
MARC AQ Forum	0696
California ARB	0682
EMA	0691

Our Response:

We did not propose, and are not finalizing, diurnal emission standards for Small SI equipment. Compared to other evaporative emission standards we are finalizing in this rule, diurnal emission control would be significantly more expensive on a cost per ton basis. This is described in more detail in Chapter 11 of the RIA. This cost sensitivity is especially noteworthy given the relatively low diurnal emission levels (on a per-equipment basis) from such small fuel tanks. However, we will continue to monitor the progress of diurnal emission control systems, such as those applied to equipment certified in California. If new designs lead to more cost effective control measures, or the environmental need justifies further controls, we will revisit this issue in the future.

Although we are not finalizing diurnal emission standards for Small SI equipment, in response to comments received, we are permanently adopting the provision allowing manufacturers to use the SHED-based procedures and standards adopted by California ARB for nonhandheld Small SI equipment. Under this approach, the evaporative emission test would be for the whole equipment rather than based on the component approach to meeting evaporative emission standards. Manufacturers expressed an interest in indefinitely preserving the option to comply with diurnal emission standards using the SHED test to be able to certify and sell products for sale in all 50 states. The SHED-based approach might allow for use of fuel tanks or fuel lines that exceed the component standards, but we believe the overall emission control (including control of diurnal emissions) will be at least as great from systems that have been tested and certified using SHED-based procedures. We have therefore incorporated the California ARB SHED procedure by reference and allow for certification using those procedures.

4.3 Marine SI standards and lead time

4.3.1 Fuel line permeation standards and lead time

What Commenters Said:

ABYC commented that it is publishing an early revision (July 2007, effective July 2008) to its gasoline fuel system standard H-24 that includes a provision for low permeation fuel hose. Concurrently ABYC has worked with the Society of Automotive Engineers to produce a now published standard on qualification testing for the low-permeation hose to meet the rule.

NMMA commented that January 1, 2009 is the appropriate compliance date for low-permeation fuel lines. The ABYC recently incorporated low-permeation fuel line requirements into the industry guidance document H-24, Gasoline Fuel Systems, and these requirements will be effective July 31, 2008. While this document serves as guidance for the industry, compliance with H-24 (as well as other ABYC specifications) is a condition of membership for NMMA. NMMA commented that the incorporation of the federal requirements into the ABYC document and NMMA's efforts to mandate compliance with those standards will help transition the entire marine industry to the use of low-permeation fuel lines. However, NMMA also stated that it will take a great deal of outreach on the part of EPA and NMMA to ensure that the recreational marine industry is aware of these new requirements and understands how to certify to the standards. For these reasons, NMMA commented that he hose standards should not be pulled ahead earlier because adequate time for the implementation of low-permeation fuel lines is critical to ensure that both engine manufacturers and boat builders are aware of the new requirements.

Sixteen boat builders commented on the implementation date for the marine hose permeation standards. In general, they commented that January 2009 would be a reasonable implementation date for these standards. Boat builders commented that an earlier date would not be feasible because EPA needs to communicate effectively to thousands of small businesses to ensure all boat manufacturers become aware of the new requirements for low-permeation fuel lines. Although compliance to ABYC H-24 is a condition of membership in NMMA, this only affects 400 or so out of 3000 manufacturers of boats in the US. In addition, boat manufacturers commented that they will need adequate time to delete their inventory. Boat builders commented that they will begin deplete inventory once final rule passed, but they would need 8-12 months after the final rule to be 100 percent compliant. Boat builders expressed support of placing the responsibility on component vendors to have parts certified to meet emission requirements.

Lowe Boats commented that, other than for fuel feed hose on pontoon boats powered by sterndrive engines, it does not have any experience in certification or testing of low permeation fuel systems. Therefore, an implementation date of January 2008 would not be feasible due to a lack of training to understand the details of the ruling and time to deplete inventory of existing fuel system components. On the other hand, Godfrey commented that it has already switched to low permeation hoses.

NMMA provided comment on how a pull-ahead for low-permeation fuel lines would be implemented given that the fuel line from the tank to the engine is typically installed by the boat builder, while the under-cowl hoses are installed by the engine manufacturer. Two suggestions are provided by EPA for implementation: (1) the engine manufacturer could specify low-permeation fuel line in the installation instructions beginning in 2008; (2) the engine manufacturer could refuse to sell engines to boat builders who do not begin using low-permeation fuel lines in 2008. NMMA stated that, assuming the compliance date is changed from 2008 to 2009, the first suggestion is the only approach of the two provided that is at all workable for engine manufacturers to accomplish the goal of the pull-ahead. Further, NMMA commented that, while including the specification for a low-permeation fuel line in the installation instructions will inform the boat builder of the requirements, there is no way for the engine manufacturer to control what the boat builder will do with the fuel lines. In recognition of this fact, NMMA recommended that EPA should include in the evaporative emissions requirements a “safe harbor” similar to that discussed above in the context of the exhaust emission standards and the OBD system under the SD/I engine manufacturer section. Under this provision, so long as the engine manufacturer includes a specification for low-permeation fuel lines, the compliance obligation with the rule would be met.

Sierra currently distributes marine fuel hose under the Shields Marine Hose brand name. Shields Marine Hose commented that these fuel lines are manufactured by a major rubber hose manufacturer who deals in automotive and industrial hose and that all of the major current suppliers of marine fuel feed lines are dependent on similar companies for their product. Shields commented that that low permeation marine fuel line is currently available from a single vendor at this time, but their factory is working on developing a cost competitive low permeation hose. Due to the time needed to develop and test new products, and the lack of priority given to marine hose by automotive suppliers, Shields commented the compliance date should be January 1, 2009. Shields stated that this implementation date will allow complete availability of tested compliant hoses from all vendors and that the time will be used to allow builders and suppliers to balance inventories. Shields further commented that builders will also need this time to make sure the less flexible low permeation hose can be routed correctly and to match fittings and hose to make sure of adequate coupling retention.

Trident Rubber and Parker Hannifin commented that there is no compelling reason to delay the hose permeation standards beyond the earliest practicable timeline. Low permeation "barrier style" marine fuel line hose (now designated and labeled "Type A1-15" as per SAE J1527 and ABYC H24 Standards) has been abundantly available, and successfully used on the majority of U.S. boats over the past 12 years. Trident stated that its factory records indicate that over 43 million feet of this hose has been supplied to the marine industry during this period. So there is strong industry awareness of and experience with this hose. Regarding the boat builders need to deplete their inventories of non-complaint fuel hose, Trident and Parker commented that this is not a problem because the majority of boat builders stock hose inventories of one month or less of their usage, and the fuel line hose is sold in quantities as small as 25 feet. Trident and Parker commented that it is logical for the EPA to have a compliance date for low permeation fuel line hose no later than the July 31, 2008 effective compliance date for ABYC and NMMA. Parker commented that guidance is necessary to ensure that the entire recreational marine industry is fully aware of these new requirements, but given the vast informational and educational vehicles currently available to boat manufacturers such as trade and consumer shows and commercial advertising, educating boat manufacturers should not be an issue.

Attwood commented that it provides fuel hose assemblies, fuel fills, ventilation components, tanks, surge protectors and fittings that total well over a hundred different products. Attwood commented that an implementation date of January 1, 2008 for fuel hose standards would be too soon considering that the EPA will not have a final ruling on the fuel hose permeation until just before the January 1, 2008 mandate. Atwood stated that it would need more time to understand and react to assure that the final product produced not only adheres to the standard but is of the highest quality as well. Aggressive timing may force Attwood, due to engineering resource concerns, make a decision that in the face of the high competition in this product category that Attwood would be better off dropping out of this product category and focus Attwood's resources on our other categories with much higher returns.

Honda commented that the implementation date for fuel filler pipe/tube permeation standards should be delayed until 2011, or at a minimum two model years of lead time from the final rule effective date and should be the same year as for fuel tanks. Referring to Section 1045.107 (a), a fuel fill pipe that is exposed to liquid fuel is considered to be fuel line according to the proposal. Honda argued that, unlike the normal fuel supply line, extra time will be needed to modify the fuel tank, design, validate and find a supplier for the larger diameter fill pipe.

California ARB commented that the fuel line permeation standard of 15 grams per square meter per day ($g/m^2/day$) is the same as those for recreational vehicles and that the California small off-road engine/equipment program has implemented this standard since 2006. California ARB further commented that its component certification data for fuel hoses supports setting a lower standard, and recommended a more stringent standard of 5 $g/m^2/day$ at 40 degrees Celsius.

NMMA: The boat builders start building for their model year in July. If EPA finalizes a rule in June or July that requires that low-permeation hose be required starting on January 1, 2009 it is already too late to build this into their product. It is also going to take quite some time before the 2000+ motorized boat builders even know that they need to do this. NMMA would recommend that EPA either put some enforcement discretion language in the preamble that explains that boat builders be required to begin installing low-permeation fuel hose in 2009 for 2010 model boats. The materials for 2009 design boats were ordered at the time of the 2007 IBEX trade show. Orders for 2010 were placed around the time of the 2008 IBEX trade show.

St. Gobain: A situation has evolved with what could be an excess of a relatively expensive raw material near the end of the year when the change-over to a new low-permeation fuel hose is required. It involves just one product type for a key OEM customer. Is there a way that EPA could accommodate a manufacturer's need to avoid scrapping unused raw material or finished goods such as fuel line? If the tubing has a manufactured date in 2008, can the engine builder use it after Jan. 1, 2009? This critical plastic raw material has a high minimum order quantity due to the reactor size used to make it. It is a unique material that is only made for us.

Letters:

Commenter	Document #
NMMA	0688
Sea Ray	0683
Honda	0705
California ARB	0682
Trident Rubber	0636
Parker Hannifin	0672
Attwood	0653
ABYC (hearing)	0642
Sea Ray	0683
S2Yachts	0697
Grady-White Boats	0677
North American Sleekcraft	0666
Triton	0656
Lund Boat Co	0655
Brunswick Corporation	0695
Brunswick Commercial and Government Products	0652
Lowe Boats	0660
Godfrey	0645
American Marine Sports	0639
Cigarette Racing	0637
Regal Marine Industry	0635
Massachusetts Marine Trade Association	0634
Regulator Marine Inc.	0632
Chaparral/Robalo Boats	0630
Ranger Boats	0628
Premier Marine Inc,	0613
Hallett	0713
Skeeter	0706
Yellowfin	0681
NMMA	0792
St. Gobain	0796

Our Response:

As proposed, the permeation standard is 15 $g/m^2/day$ for marine fuel lines. This standard is supported by test data presented in the Final RIA on low-permeation marine fuel lines. The implementation date for this standard is January 1, 2009. This means that any boat, portable fuel tank or outboard engine manufactured on or after this date would need to use fuel lines compliant with this standard. We allow for production of noncompliant fuel lines to serve as replacement parts as described in Section 4.7.10.

There are two exceptions to the above implementation date. First, as discussed below in Section 4.3.3, we are providing additional lead time for under-cowl fuel lines on outboard marine engines. Second, we will allow boat builders to use up their existing inventory of fuel lines provided under normal business practices, even beyond the standard date. However, manufacturers would not be permitted to circumvent the standards by stockpiling noncompliant hose just prior to the implementation of the standards.

Low-permeation marine fuel lines and fill neck hose are already commercially available. In fact, many manufacturers already use low-permeation fuel lines on their boats. In addition, ABYC recently incorporated low-permeation fuel line requirements into the industry guidance document H-24, Gasoline Fuel Systems, and these requirements will be effective July 31, 2008 and are mandatory for NMMA certification.

We first proposed these standards in 2002. We reproposed these standards in 2007, with the clear understanding that low-permeation was now readily available and would be expected for the 2009 model year. The delayed timing of the final rule requires that we specify January 1, 2009 as the start date rather than the 2009 model year. While we are prepared to accommodate existing inventories of fuel lines, we find it highly problematic to learn that manufacturers are admitting that they are continuing to order significant quantities of high-permeation fuel line in October 2007 and plan to continue to order high-permeation fuel line in October 2008 such that they will be unable to comply with standards using normal inventory practices until the 2011 model year. Based on the information supplied by Trident regarding normal inventory practices, we expect that inventories of high-permeation fuel line will generally be depleted within 30 days following the effective date of the regulation. Any high-permeation fuel lines installed in vessels after this time would be determined to violate the stockpiling prohibition unless the manufacturer could demonstrate that unusual circumstances caused the inventory of high-permeation fuel lines to exceed a 30-day supply. The circumstances described by St. Gobain would appear to qualify for an allowance for extended inventories. Placing routine orders for high-permeation fuel lines in 2007 and 2008 in such that inventories of these fuel lines would allow for continued production more than 30 days after the effective date of the regulation where low-permeation fuel lines were also available would clearly not be an acceptable demonstration in this regard.

4.3.2 Fuel line permeation- fill neck

What Commenters Said:

NMMA expressed concern about including filler necks, under certain conditions, in the fuel line definition. NMMA commented that the inclusion of the filler neck in the definition for “fuel line” is contrary to their understanding of what is supposed to constitute a fuel line. They argued that filler necks are not intended to store fuel, which is further demonstrated by the applicable ABYC standards. NMMA stated that evaporative emissions from filler necks are very low, and referenced testing performed in 2005 that demonstrates this. Given the characteristics of a filler neck and the low evaporative emissions associated with this component, NMMA recommended that EPA delete the language in § 1045.801 which says “if any portion of the filler neck material continues to be exposed to liquid fuel after a refueling event in which an operator fills the tank as full as possible.”

Yamaha provided further explanation on the above concern expressed by NMMA regarding the fuel line definition. Yamaha stated that Federal regulations (33CFR Subpart J 183.501~183.590) and ABYC H24 require marine fuel fill hoses be “self draining” and installed at or above the top most portion of the fuel tank. Also H24.5 requires a 5 percent vapor space be applied to the tank for compliance for fuel expansion. Yamaha commented that there is no available or feasible technology today to prevent a consumer from overfilling a designed system on a boat or for current automotive except for education and warnings. Yamaha provides, in the Owners Manual, directions for proper filling. These directions state that the owner should not fill the fuel fill hose with gasoline and, for PWCs, to stop filling the tank at least 2” (inches) from the top surface of the tank. When the engine hatch is open, Yamaha stated that there is a visual indication of fill level for their PWCs. Yamaha requested that the last sentence under the definition for fuel line be stricken because this is a consumer tampering issue that is uncontrollable through boat design.

Letters:

Commenter	Document #
NMMA	0688
Yamaha	0721

Our Response:

The purpose of this definition was to include fuel lines exposed to liquid fuel and exclude fuel lines exposed only to fuel vapor (or short wettings in the case of fill necks). Data in the RIA suggests that vent lines and fuel fill necks generally have relatively low permeation when exposed to fuel vapor under normal fuel system configurations. At the same time, data in the RIA shows that vent lines and fill neck hose have relatively high permeation when exposed to liquid fuel. In the case where a vent line or fuel fill neck stores liquid fuel after a refueling event, we believe that these components should be covered by the fuel line permeation standards. For this reason, we specifically added a reference to vent lines that fill with fuel after a refueling event in the definition of fuel lines.

We agree with the comment that the definition of fuel lines should not be based on operator behavior. Therefore we revised the definition of fuel lines to focus on the design of the fuel system rather than operator behavior. In the case where a fuel system is designed such that, under a normal fuel filling event, the vent line and fill neck are not exposed to liquid fuel, then they would not be considered to be fuel line for the purposes of the permeation standards. For example, a fuel system can be designed to work with a fuel shut-off control on the fuel fill nozzle such that the nozzle shuts off before the tank completely fills. This would provide the vapor space specified in ABYC H24 and prevent the vent line and fill neck from storing fuel. We would not consider the vent line and fill neck to be subject to the permeation standards in this design. We recognize that, under this design, an operator could fill the tank higher by repeatedly restarting the fuel pump after it shuts off. In this case, we would expect the manufacturer supplied directions for proper filling to state that the owner should not restart the pump after automatic shut off.

4.3.3 Fuel line permeation– under-cowl fuel lines

What Commenters Said:

Several manufacturers commented that additional lead time would be necessary for fuel lines used under the cowl on outboard marine engines. These manufacturers included NMMA, Mercury, Suzuki, Yamaha, Honda, Sea Ray, American Marine Sports, Cigarette Racing, Yellowfin, Parker-Hannifin, and Trident Rubber.

Manufacturers commented that, despite the fact that low-permeation hoses are commercially available, a major concern for OB engine manufacturers is the ability to meet the requirement to use low permeation hoses under the engine cowl, on outboard engines, by 2009. These smaller hose sections between the engine mounted fuel-system components and connectors are preformed or injection- molded. Manufacturers insisted that a model year 2009 compliance date for these under-cowl hoses is simply not feasible given that hundreds of hose parts will have to be redesigned and manufactured and stated that the alternative proposal in the preamble to allow the under-cowl hoses additional time for compliance is therefore necessary and appropriate. NMMA and Mercury expressed support for the concept of EPA's optional approach for implementation that would allow under-cowl hoses delayed implementation in exchange for an earlier compliance date for low-permeation fuel line from the fuel tank to the engine. However, given that the promulgation of the final rule will not occur until the end of this year at the earliest, NMMA and Mercury recommended that EPA finalize a revised schedule that would account for the one year delay. Using EPA's proposed approach, the revised schedule would be January 1, 2009 for implementation of low-permeation fuel lines and a phase-in of 30-60-90 percent for under-cowl hoses between model year 2010 and 2012 and 100 percent compliance in model year 2015. This phase-in schedule was also specifically supported by Suzuki, Yamaha, and Honda

Suzuki recommended a single year averaging approach is appropriate for compliance under the proposed phase-in concept. This would consist of calculating the total interior surface area of the under-cowl fuel line installed on each model variation in a manufacturer's full product line, determining the total hose surface area from projected sales by engine family and model, and implementing complaint hose as necessary for a given model year and phase-in percentage. Under this approach, the manufacturer would have the flexibility to select which fuel lines can most appropriately be revised in a cost-effective manner while ensuring overall compliance with the standards.

Letters:

Commenter	Document #
NMMA	0688
Yamaha	0721
Mercury	0693
Suzuki	0698
Trident Rubber	0636
Parker Hannifin	0672
Yamaha (hearing)	0642
Sea Ray	0683
Brunswick Corporation	0695
Brunswick Commercial and Government Products	0652
American Marine Sports	0639
Cigarette Racing	0637
Yellowfin	0681

Our Response:

Outboard engine manufacturers have expressed concern that it will be difficult for them to meet final 2009 date for the sections of fuel lines that are mounted on their engines under the engine cowl. While some sections of straight-run fuel line are used on the outboards, many of the smaller sections between engine mounted fuel-system components and connectors are preformed or even injection-molded parts. Outboard engine manufacturers stated that they will need additional time to redesign and perform testing on low-permeation fuel lines under the cowl. To address this issue, we are finalizing a phase-in of under cowl fuel line permeation standards. For each engine, we are adopting a phase-in, by hose length, of 30 percent in 2010, 60 percent in 2011, 90 percent in 2012-2014 and 100 percent in 2015 and later. This will allow manufacturers to transition to the use of low-permeation fuel lines in an orderly fashion.

In the NPRM, we asked for comment on an optional program whereby manufacturers would have to offset this delay in hose permeation control by pulling ahead straight-run fuel lines exterior to the cowl. We are not finalizing this phase-in as being dependent on a pull ahead of straight-fuel lines for two reasons. First, the implementation would be difficult given that the outboard engine manufacturer installs the under cowl fuel lines, while, in most cases, the boat builder installs the straight-run fuel lines from the engine to the fuel tank. Second, given the timing of the final rule, there is little opportunity for pulling ahead the use of low permeation fuel lines.

In the NPRM, we also discussed basing the phase-in on a per-engine basis or a per-manufacturer basis. Suzuki commented that the phase-in be calculated across the manufacturer's full product line based on inside surface area of the under cowl fuel lines. We believe that this approach is overly complex for this transitional program. Instead, we are basing the phase-in on length of the fuel lines for each engine. By using this approach, it removes the need to establish a credit trading program between engine models and greatly simplifies implementation of this program.

4.3.4 Fuel line permeation– primer bulbs

What Commenters Said:

Several manufacturers commented that additional lead time would be necessary for primer bulbs. NMMA, Mercury, Suzuki, Yamaha, Trident Rubber, Shields Marine Hose, Parker Hannifin, Attwood, Sea Ray, Grady-White, Triton, Brunswick Corporation, Lowe Boats, Godfrey, Regulator Marine. NMMA commented that, for small business boat builders that are unfamiliar with the certification process, certifying a bulb as part of the fuel system will be difficult.

Manufacturers stated that the implementation date for the proposed permeation standard for fuel lines in causes concern for OB manufacturers in the context of the primer bulbs. Manufacturers argued that there are currently no low-permeation primer bulbs available in the marketplace. To require low-permeation primer bulbs in model year 2009 would mean that this product would have to be available next year. Manufacturers insisted that this compliance deadline will be impossible for industry to meet given that manufacturers would have to design, test and produce the requisite product by next year. In light of the lack of a compliant product, several manufacturers recommended a model year 2011 compliance date for primer bulbs. NMMA stated that this date would give industry a two-year lead time from the date the rule is finalized, which should provide industry with enough time to develop primer bulbs that can meet the EPA standards. Other manufacturers, stating similar reasons, recommended an implementation date of 2010 for primer bulbs.

Yamaha commented that it has been researching various materials for permeation compliance and to increase the ability of a primer bulb to withstand federal fire test standards for under deck installation. Yamaha stated that its testing has shown that current fluorination processes to NBR material (FKM product) produces some desired effects however low temperature operation is greatly diminished when temps fall at around 20°F. Since a primer bulb is used in a very diverse market, Yamaha commented that this current technology may have its place but unfortunately use and durability in the colder climates are jeopardized. Yamaha stated that it will continue testing to achieve a balance in both use and durability and permeation compliance. Suzuki commented that it has already identified some promising materials and designs; however it is too early to know if these materials will actually function as desired. Assuming that a suitable material is identified, Suzuki stated that the primer bulb will still need to be designed, validated and produced in quantity. It is expected that this process will take a minimum of two years to complete. Yamaha and Suzuki recommended that EPA revise the effective date for implementation of low-permeation primer bulbs until the 2011 model year, which will allow a minimal two years of lead-time to develop the appropriate new products.

Sierra Marine hose stated that it currently manufacturers primer bulbs and primer bulb assemblies for the marine industry. Sierra stated that permeation resistant compounds such as FKM are available to make low permeation primer bulbs; however, permeation is not the only criteria needed to produce usable safe fuel primer bulbs. Primer bulbs must also be ultraviolet light resistant, have high shear strength and be abrasion resistant. The material must also remain flexible over a wide temperature range. Studies must be run to examine swell, heat ageing and coupling retention. Sierra stated that it needs to have time to do all of the testing and possibly need to build new tooling or purchase new production equipment. In addition to the above, Sierra commented that a non-fire retardant SAE J 1527 hose needs to be developed as none currently are available. The complete hose assemblies then must be tested for all of the above criteria. Sierra must also develop new production lines to assemble the bulbs and fuel line assemblies. New packaging will also be required.

Atwood commented that there is not a primer bulb on the market which will meet EPA's current proposal. Again, the engineering time associated with the development of a "white space" product is somewhat lengthy due to the fact that possible new materials and/or manufacturing processes may be required to meet the constraints of the new ruling. Atwood state that its current endeavors in the design and possible manufacturing of a new primer bulb to meet the requirements of the ruling is more on track for the 2010 timeframe. Even then, Atwood expressed concern that there are a lot of unknowns that could delay a new primer bulb introduction.

Mercury commented that some small outboards utilize an engine mounted, push primer such as those that were excluded from evaporative emissions standards for small nonroad engines. Mercury stated that it is appropriate to also exclude them on small outboard engines as well because the evaporative emissions from these primers would be extremely small, have not been quantified, and there is no development work done to date as to whether there is a need or a technology to reduce permeation from these components.

Letters:

Commenter	Document #
NMMA	0688
Sea Ray	0683
Yamaha	0721
Mercury	0693
Trident Rubber	0636
Shields Marine Hose	0624
Attwood	0653
NMMA (hearing)	0642
Sea Ray	0697
Grady-White Boats Inc.	0677
Triton	0656
Brunswick Corporation	0695
Brunswick Commercial and Government Products	0652
Lowe Boats	0660
Godfrey	0645
Regulator Marine Inc	0632

Our Response:

At the time of the proposal, we agreed that low permeation marine primer bulbs were not commercially available. However, we also stated our belief that low permeation fuel line materials were available and could be used for manufacturing primer bulbs. In the proposal, we specifically identified FKM, which is an elastomer that has long been used in fuel line applications. Many grades are available that range in permeation resistance, cold weather properties, and flexibility. We recognized that some development time would be necessary to develop primer bulbs of this (or other) low permeation fuel materials.

Since the NPRM, we have received information supporting the proposed position; a new primer assembly has been developed that meets the fuel line permeation standards. This assembly uses a spring loaded piston as the pumping device rather than depending on the flexibility of the housing material. In appearance, it is similar to existing primer bulbs. This product is not yet commercially available, but serves as an example of how technology progresses, given sufficient incentive and time.

We agree with manufacturers that additional lead time is necessary to design, validate, and produce low permeation primer bulbs. Therefore, we are finalizing an implementation date of 2011 for primer bulbs. Mercury commented that engine mounted, push primers are not included in the fuel line definition for Small SI equipment and should not be included for marine products as well. We excluded these primers for Small SI engines because fuel drains from them after priming and they are not usually exposed to liquid fuel. We agree with Mercury that these primers should be excluded from the fuel line definition for marine products as well.

4.3.5 Tank permeation standards and lead time

What Commenters Said:

Environmental Defense stated that it is pleased that EPA has chosen to adopt fuel tank standards for SI small and marine engines. The California Air Resources Board expressed support of fuel tank permeation standards but stated that the standard of 1.5 $g/m^2/day$ should be based on testing on CE10 at 40°C rather than at 28°C. California ARB commented that component certification data from the small off-road engine program in California supports setting a lower standard. California ARB also commented that the phased-in schedule to meet the fuel tank permeation standards is too lengthy and that two years is sufficient time to allow manufacturers to design and produce equipment meeting the new evaporative standards. California ARB pointed out that the control technology is readily available and currently used in lawn and garden equipment in California.

Trident Rubber commented that more time is necessary for development and availability of compliant fuel tanks but the early use of low permeation fuel line hose and vent line hoses will provide evaporative emissions reductions that can enable time extensions for fuel tanks.

NMMA stated that it can support the requirement for low permeation plastic fuel tanks, with the reservation that any new technology can meet marine durability standards. NMMA commented that it does not dispute that the level of the standard is feasible and the implementation date for PWCs and portable tanks is achievable; however, NMMA expressed concern that the implementation date for SD/I and larger OB fuel tanks is overly ambitious. NMMA asserted that trials run by tank manufacturers using multi-layer construction technology have indicated the following problems: inconsistent impact strength, fitting leaks, processing difficulties, tank brittleness, and inability to repeat processing to provide adequate and uniform second layer construction. Based on concerns that there are no commercially available rotational-molded tanks that could meet the proposed standards and that additional testing and trials must be conducted, NMMA stated that it has serious reservations about imposing a 2012 compliance deadline for rotational-molded tanks. To address these concerns, NMMA recommended that EPA perform a technical review in 2010 and impose an implementation date based on the findings.

Brunswick commented that the advent of cross linked polyethylene tanks offered boat builders with an alternative material to ensure tank longevity. Brunswick stated that the current permeation requirements still have not yielded a commercially viable solution other than a whole scale return to aluminum. Brunswick expressed concern that, while many larger tanks are still made of aluminum, the increase in bio fuels will bring about larger water content in the fuel tanks based on the known properties of ethanol and that increased water brings corrosion concerns that we must deal with. Brunswick recommended that we consider a standard for tanks similar to that of fuel hoses in order to explore these issues.

Inca commented that when cross-link polyethylene was first introduced into the marine market, fuel tanks began failing in the field and resulted in a national recall and all the tanks had to be removed out of the boats. Inca stated that it pioneered the first successful plastic fuel tank by researching, redeveloping, and building on the mistakes the first manufacturer made. Inca commented that, even then, the plastic tanks were phased in slowly to provide field experience to gain confidence and make any necessary adjustments. Inca stated that a similar process is necessary for the implementation of low permeation marine fuel tanks.

Inca argued that the many experimental products and processes used to manufacture low-permeation tanks have not demonstrated the characteristics needed to consistently manufacture fuel containment products with the confidence that is needed to avoid fuel spillage and insure safety to users of marine vessels and other original equipment products. Inca stated that it has had extensive material trial experiences with Arkema, Exxon/Cyclics, Ticona, Solvay, Fluro-Seal, and A. Schulman. Inca reported problems they have encountered which included: fitting leaks, holes, brittleness, repeatability (high scrap rates up to 75%), constant reformulations in materials, machinery modification issues that require untested maintenance practices, premature second layer kick off resulting in commingled layers, difficult process changes that are not realistic in a major production setting, and bulk storage problems of the second layer materials. Due to these kinds of problems, the Inca concluded that the industry does not have a commercially proven product (raw material) that will enable them to manufacture roto-molded Marine fuel tanks to 1.5 $g/m^2/day$.

Inca made several recommendations for what is needed before they will be able to produce low-permeation marine fuel tanks. They stated that material suppliers need to continue refining their materials. Inca claimed that no materials are commercially available or readily processable, although some have passed California ARB requirements. Inca stated that more time for internal testing to see that the multi-layer materials hold up to the demanding areas of the process variables, mold variables, and design variables that Inca works with day in and day out. Inca stated that it needs more external testing data on multi-layer tank models from outside labs on mechanical strength tests that are required by H-24. Inca commented that it takes time and cumulative experience and knowledge to get it right. Finally, Inca stated that it needs marine field testing data and a phase-in period to limit the number of new tanks going into the field in order to contain its risks of unexpected performance issues that may arise from uncharted waters of rotation-molded multi-layer fuel containment. Due to these concerns, Inca recommended that EPA perform a technical review in 2010.

Promens commented that some barrier layer materials may increase the brittleness of plastic marine fuel tanks, thus lowering the impact needed to create a ductile failure of the tank shell. Promens performed dart impact testing on one low permeation barrier approach and saw that the effect of the peculiar barrier layer causes significant flexibility changes in the cross link polyethylene shell, lowering its impact resistance. Promens commented that we should not degrade personal safety for environmental benefits and that impacts to the tank such as mishandling, poor transportation, manufacturing accidents, or in-field use should not result in a lower expectation of performance.

Grady White requested that EPA withdraw 2012 implementation date, revisit the technology in 2010, and set an implementation date at that time. Grady White commented that time is needed to develop, test, and field prove new technologies and that the proposed implementation schedule is too aggressive considering there are no permanently installed, field-proven, low permeation tanks currently in-use. Grady White stated that a number of issues have been communicated from tank molders including ability to warrant barrier layer, lack of field experience, impact resistance, processing expense, and processing control.

Arkema commented that it supplies PetroSeal technology and is eager to work with tank manufacturers to help them meet the tank permeation standards. This technology is a two-layer fuel tank. The inner layer is Rilsan Polamide 11, which is an engineered polymer which may be used to create a permeation barrier in rotation-molded fuel tanks. Arkema stated that this specialty nylon, which is used in automotive fuel lines, gives excellent resistance to fuel permeation, and is a tough, impact-resistant polymer. Arkema commented that this material is dimensionally stable, molds very easily and is manufactured from a renewable resource (100 percent bio based from a vegetable oil). In a low-permeation, roto-molded fuel tank, the the outer side of the layer is metallized polyethylene which has an excellent resistance to alcohol permeation and molds very easily. The inner layer is the PA11 which is designed to adhere with the outer layer to ensure the structural integrity of the tank and to ensure minimal permeation. As a result, Arkema concludes that tanks manufactured with PetroSeal are very low permeation, very tough and cost-effective.

Arkema commented that the PetroSeal technology meets current EPA permeation regulations as tested by EPA laboratories (see the RIA) and has received a California ARB exemption for the small off road and recreational vehicle tanks. Arkema also stated that the tanks using this construction have been demonstrated to meet US Coast Guard requirements for mechanical strength and fire resistance for permanently installed marine fueled tanks. Arkema had a ten gallon and 40 gallon fuel tank manufactured and tested by Imanna labs. In addition, a lawn and garden fuel tank using this technology passed the SAE J288 snowmobile impact test.

Arkema commented that PetroSeal is a commercially active technology today and they are selling this material for use in motorcycle fuel tanks.

Solar Plastics commented that they have conducted an active research and development effort for many years and that numerous tooling, material, and processing concepts have been invented, evaluated, or optimized in their test facility. Solar has been working with Arkema and now produces multi-layer rotation-molded fuel tanks. Solar Plastics commented that it has established safe, reliable, and consistent processes to mold the two layer PetroSeal material system. Solar asserted that these molded tanks exhibit excellent adhesion between layers, impact strength that meets various industry standards, and permeation resistance well within proposed standards. PetroSeal fuel tanks molded by Solar Plastics satisfy durability requirements adopted by the marine, and lawn and garden equipment industries. These include ambient and cold temperature impacts, and burn tests. Molding methods are cost efficient, and utilize the same tooling and machinery that produce single layer tanks. Based on these considerations, Solar Plastics concluded that technology is available today to rotation-mold fuel tanks that meet the proposed evaporative emissions standards.

Centro commented that, in anticipation of low permeation requirements for fuel tanks for Small SI equipment and for boats, they have worked hard over the last five years to develop a solution that meets all requirements. Centro stated that they have a solution that is as durable as current rotation-molded tanks and meets all other criteria. Centro commented that they have invested hundreds of thousands of dollars in successfully developing and testing this technology, and that it would be a disservice to the environment to delay tank permeation standards.

Briggs and Stratton and EMA commented that the proposed alternative fuel tank standard of 2.5 g/m^2/day standard at 40°C is not supported by theory or literature to be equivalent to the 1.5 g/m^2/day standard at 25°C. They stated that the alternative standard should be changed to 3.0 g/m^2/day at 40°C. California ARB commented that the alternative of 2.5 g/m^2/day at 40°C suggested by U.S. EPA should not be an option because this standard is too lenient based on certification data which supports a tougher standard.

Letters:

Commenter	Document #
NMMA	0688
Environmental Defense	0648
California ARB	0682
Trident Rubber	0636
Inca Molded Products	0700
Briggs and Stratton	0657
Brunswick (hearing)	0642
Grady-White Boats	0677
Arkema (hearing)	0642
Solar Plastics (hearing)	0642
Inca Molded Products (hearing)	0642
Promens (hearing)	0642
EMA	0691
Centro	0737

Our Response:

During the development of the proposed rule, we worked closely with the recreational marine fuel tank industry to understand their products, business practices, and production processes. Information gathered from these interactions was used to craft the proposed regulatory provisions related to controlling gasoline fuel tank permeation emissions. During these discussions, important issues were identified with respect to concerns regarding the technical feasibility of controlling permeation emissions from the cross-link polyethylene (XLPE) rotation-molded tanks.

Manufacturers assert that the availability of rotation-molded fuel tanks is critical to the marine industry. This type of fuel tank is installed in many recreational marine vessels powered by SD/I and outboard engines. The rotational molding process, which has low capital costs relative to injection molding, facilitates the economical production of fuel tanks in the low production volumes as required by boat builders. Furthermore, plastic fuel tanks offer advantages over metal fuel tanks, both in terms of cost and corrosion resistance. The advantages of XLPE over other plastics used in fuel tanks today such as HDPE are its compatibility with the rotational molding process and the ability of XLPE fuel tanks to meet the U.S. Coast Guard safety tests, especially the flame resistance test.

We have concluded that the 2012 fuel permeation standards are technologically feasible and appropriate for rotation-molded marine fuel tanks. This conclusion is supported by data presented in the Regulatory Impact Analysis from comments submitted by two fuel tank manufacturers after the proposal. Since we initially proposed tank permeation standards for marine fuel tanks in 2002, several manufacturers have shown progress in the development of low permeation, rotation-molded tanks. In addition, this rule provides about 36 months of lead time for rotation-molded tank manufacturers to address remaining technology issues and to certify their products.

However, commenters expressed a concern that some rotation-molded tank manufacturers are not as far along in their technological progress toward meeting the standards and are not certain about their ability to meet the EPA requirements in 2012. To address this situation, these manufactures have requested that EPA perform a technical review in 2010 to determine whether the compliance dates should be adjusted. However, we believe that the tank permeation standards have been demonstrated to be technologically feasible in the 2012 time frame. The RIA identifies several technologies that could be used to reduce emissions from rotation-molded tank including barrier materials and post processing coatings. In addition, alternative construction methods may be used such as low-permeation fiberglass. Finally, if the boat building industry were to accept standardized fuel tank sizes, fuel tank manufacturers may be able to make use of higher production volume, low permeation, manufacturing processes such as coextrusion blow-molding. Therefore, we do not believe that a technology review of the permeation standard is necessary or appropriate.

Nevertheless, we are concerned about the potential long-term impacts on the small businesses that have not yet developed technology that meets the requirements. Although marine fuel tanks must comply with Coast Guard safety regulations, marine fuel tank manufacturers have never been required to certify to permeation standards. The rotation-molded tank manufacturers are generally small businesses who have limited engineering staffs and are dependent on materials suppliers for their raw materials.

During the next few years, EPA intends to hold periodic progress reviews with small businesses that manufacture rotation-mold fuel tanks. The purpose of these progress reviews will be to monitor the progress of individual companies towards compliance with the tank permeation standards and to provide feedback as needed. Rather than conducting a broad program with the entire industry, we will conduct separate, voluntary reviews with each interested company. These sessions will be instrumental to EPA in following the progress for these companies and assessing their efforts and potential problems.

To help address small-business concerns, we are relying on the hardship relief provisions for small-volume manufacturers in 40 CFR 1068.250. In the event that a small-volume manufacturer is unsuccessful in the 2012 model year and seeks hardship relief, these progress reviews would provide an important foundation in determining whether a manufacturer has taken all steps to comply with the permeation standards in a timely and orderly manner.

We are finalizing the optional alternative standard of 2.5 $g/m^2/day$ at 40°C as proposed. This alternative standard is intended to provide flexibility to manufacturers that wish to perform a single permeation for certification to EPA standards and for use in certifying to the California ARB Small SI standards. The intent of the higher limit of 2.5 $g/m^2/day$ is to account for increased permeation rates at elevated temperature. This increased limit is not intended to represent how an average tank may perform and is not intended to be mathematically equivalent to the primary standard, but it is rather intended to provide reasonable assurance that a tank certified at the higher temperature would pass the primary standard of 1.5 $g/m^2/day$ at 28°C. This adjusted standard at 40°C is based on data presented in the RIA and is intended to account for variability in how different materials will respond to increases in temperature.

4.3.6 Tank permeation– under-cowl fuel tanks

What Commenters Said:

Yamaha commented it is unclear in the proposal if small, engine mounted fuel tanks would be subject to the proposed permeation standards. NMMA and Brunswick commented that there is no specific mention of these small tanks in §1060.103, as proposed. Yamaha stated that there is no credible evidence to show that small on engine mounted tanks are a contributor to HC emission losses during non-running/storage conditions. NMMA, Yamaha, and Brunswick argued that it is common industry practice for these small engine-mounted tanks to be drained of fuel prior to storage resulting in very low evaporative emissions. As an example of this, NMMA and Yamaha provided an excerpt from outboard engines owner's manual which specified that the owner drain the gasoline from the tank when the engine is stored for prolonged periods of time (2 months or longer).

Yamaha also commented that their portable engines with engine mounted tanks are dual fuel capable. What this means is Yamaha includes is a selector valve inline that provides for 2 sources of fuel supply. The operator can select either a larger 3 or 6 gallon portable tank, or the much smaller available 1.2 liter on-engine tank. Based on their experience, Yamaha stated that most operators choose the external portable tank for its volume for extended operation and never use the engine mounted version. Due to their light weight, Yamaha claimed that these engines are normally removed for transportation and for storage both in boats and home garages.

Brunswick and Yamaha recommended that EPA exclude engine-mounted tanks, 2.0 liters and under, from the fuel tank permeation standards.

Letters:

Commenter	Document #
Sea Ray	0683
Suzuki	0698
EMA	0691
Yamaha	0721
Mercury	0693

Our Response:

The proposed regulatory text clearly included engine-mounted fuel tanks under the proposed tank permeation standards. Proposed §1045.107 stated that "Other installed fuel tanks must meet permeation standards starting in the 2012 model year." Proposed §1060.801 defined installed fuel tanks as "any fuel tank designed for delivering fuel to a Marine SI engine, excluding portable nonroad fuel tanks." Due to the confusion expressed by commenters, we are adding a clarifying statement to §1060.103 that states that engine-mounted fuel tanks are an example of Marine SI fuel tanks.

We do not believe that it is appropriate to rely on operator behavior as a control strategy for permeation emissions. Even in the cases where the operator drains the fuel tank prior to storage, it is unlikely the tank will be drained completely. Any fuel or vapor left in the fuel tank would have the potential to permeate. In addition, the maintenance instructions provided by Yamaha and NMMA only suggest that the fuel tank be drained for prolonged storage. Other maintenance recommended for long storage included draining oil, fogging the engine, draining the cooling system, and greasing the spark-plug threads. These maintenance steps are clearly not intended to be performed after each engine use. Fuel would likely permeate through the fuel tank whenever the engine is not being put into long term storage. Although a 2.0 liter fuel tank is small compared to most marine fuel tanks, it is comparable in size to fuel tanks used on many Small SI applications, many of which are engine-mounted. As with Small SI fuel tanks, we believe that Marine SI fuel tanks, even engine-mounted tanks, contribute to HC emissions in our nation's air. Therefore, we are finalizing the tank permeation standards for all Marine SI fuel tanks, including engine-mounted fuel tanks.

4.3.7 Diurnal – installed fuel tanks

What Commenters Said:

The California Air Resources Board (ARB) commented that that the proposed lead time for the implementation of passively purged carbon canisters is also too lengthy. ARB argued that this technology is widely used and has been proven by the automotive industry and recommended that the diurnal standards be implemented with the 2009 model year. ARB also noted that actively purged canisters could further reduce vented emissions. ARB recommended that a diurnal performance standard be set for high production volume marine spark-ignition vessel manufacturers, arguing that, without a performance standard, U.S. EPA cannot validate emission reductions. ARB stated that a design-only standard would not take into account connector losses, carburetor emissions, and leaks from poorly designed integrated engines. As a result, they recommended that the diurnal standard include emissions from complete evaporative emission systems, to be measured over three days (without a carbon canister) or seven days (with a carbon canister), and be based on tank volume. This is consistent with on-road vehicle test procedures.

Environmental Defense expressed support of EPA's proposed diurnal standard and for a near term implementation date for marine fuel tanks. Environmental Defense noted that the proposed diurnal standard for marine engines will control diffusion emissions from recreational boats sufficiently. However, if EPA were not to finalize the diurnal standard, then Environmental Defense would object to the omission of a diffusion standard for marine engines. Because EPA did not propose running loss standards for marine engines, and diurnal emission control would help control running loss emissions, Environmental Defense commented that EPA should finalize a diurnal standard immediately.

Delphi commented that many factors will affect the efficiency of the evaporative emissions system, including canister size, configuration (length vs. cross-section), carbon type, operating temperature, fuel vapor flow rate, and other factors which impact the HC adsorption capabilities of the canister. Delphi stated that proper installation and use of carbon canisters in marine applications (where diurnal emissions regulations are proposed) will effectively reduce evaporative emissions. Delphi expressed support for a useful life of five years. They commented that this useful life period is consistent with Delphi's long-term experience with automotive canisters

Delphi also stated that the proposed implementation date of 2010 is acceptable from a canister component perspective. Carbon canisters are a fairly mature technology. The canister designs currently intended for marine use are relatively simple designs. Delphi said that it will continue to work with NMMA and ABYC to define the canister design requirements and proper installation and use. Delphi did note that, input from NMMA and/or ABYC may indicate system-related challenges that may require additional time to solve. Delphi expressed support for the proposed requirement to design the system to prevent liquid fuel from entering the canister, noting that exposure to liquid fuel will significantly reduce the ability of the canister to adsorb HC vapors. Delphi stated that, following exposure to liquid fuel, purging the canister, particularly in a passive purge system as proposed for marine applications, would be a lengthy process, and permanent degradation in canister working capacity may result. Delphi also expressed support for the proposed alternative standard for non-trailerable boats because fuel temperature variation, and thus diurnal emissions will be less than that experienced on trailerable boats.

NMMA said that they had performed successful in-use tests on carbon canisters installed on boats and had data showing sufficient emission reductions from passively purged canisters to meet the proposed standards. However, NMMA expressed concern that more time may be necessary to ensure that these systems are properly installed. One issue that manufacturers raised was that if the liquid fuel separator were to clog, or if the carbon canister were to be exposed to liquid fuel and clog, that this could result in pressurization of the fuel system. NMMA also stated that 3,000 boat builders would be potentially required to install carbon canisters and time would be necessary for the industry to develop installation standards that could be used by all boat builders to ensure that they are properly installing the carbon canisters in their boats.

Several other fuel system component manufacturers and boat builders commented that the proposed diurnal emission standards are feasible, given enough lead time. However, they commented on a number of technical challenges that they would need to address. Boat builders commented that adequate space must be dedicated and that space will need to be located above the plane of the top surface of the fuel tank. In addition, the canister would need to be high enough to prevent liquid fuel from entering the canister during expected changes to the vessel's attitude during normal use. An alternative, presented in the comments, is the use of a liquid/vapor separator device. While effective, commenters expressed concern that the component would add complexity and cost-location for both items will have to allow access to the fittings for inspection to meet ABYC standards. Therefore, installation and access would need to be designed to be within the vessel's appearance. In addition, boat builders commented that a high number of different sized canisters would be burdensome. Several boat builders commented that further research and testing must be performed to ensure safe and effective installation of carbon canisters on boats. Inca recommended that the EPA provide a technical review of carbon-canister technology in 2010.

ABYC testified that the well-established technology of automotive carbon canisters is presenting many challenges when adapted to the marine environment. ABYC established a carbon canister working group in 2006 including Delphi, Meade-Westvaco, the US Coast Guard Office of Boating Safety and industry fuel component experts to discuss, and eventually overcome, the safety issues surrounding this solution. ABYC stated that they began writing a marine focused standard to address all aspects of a canister on board a boat due to the absence of a universally accepted standard on the construction and installation of a canister on a boat. As part of this effort, ABYC explained that size, construction, shock, vibration, installation, and service environments are all concerns that are being addressed. ABYC commented that the nature of the carbon and the canister itself causes some unique issues that could result in pressurization of a marine fuel tank which violates the 33 CFR regulations that apply to recreational boats fuel systems. ABYC referred to this issue as a challenge to overcome that will take time to effectively solve.

The Coast Guard expressed concerns with the proposed option regarding the pressurizing of the fuel system, especially for large non-metallic fuel tanks (even to one psi), to meet the diurnal standards. Coast Guard stated that pressurizing non-metallic marine fuel tanks causes them to expand like a balloon which, among other problems caused by the expansion, may easily lead to fuel leaks in the tanks. Coast Guard also expressed concerns that the use of carbon canisters in fuel vent lines is not yet a proven marine technology. While they have been assured that the canisters can pass the battery of tests required of fuel system components, they have not yet seen test results. Coast Guard stated that they are continuing to work with a canister manufacturer in conducting appropriate testing but have not yet seen whether satisfactory results are achievable. Coast Guard commented that their main concern with the carbon canister option is the necessity for installing a check valve in the vent line to prevent liquid fuel from entering the canister. Coast Guard explained that the installation of this check valve may require the reconfiguration of the fuel systems in many boat models to prevent blockage of the vent line by liquid fuel when the boat is at an other than static float plane attitude which may in-turn require changes to the current industry fuel system standards. Additionally, there are no carbon canister construction or installation standards which Coast Guard believes may be critical safety considerations. Coast Guard stated that they remain optimistic that all of their concerns can eventually be satisfactorily addressed but we are commented that they believed more time may be needed for implementation of the diurnal standards.

During the comment period, NMMA recommended model year 2011 as the appropriate implementation date for diurnal emission standards and commented that this would provide industry with sufficient time for sorting through the remaining technical issues associated with carbon canisters on boats. Several boat builders and other NMMA members requested additional lead time, many of which also recommended a 2011 implementation date. Brunswick commented in favor of a 2011 implementation date, but also recommended a phase-in approach so that ABYC could work on a standard for the canister, and address the possible pressurization issue.

After the comment period closed, Brunswick provided more detailed information on a phase-in approach. Specifically, Brunswick recommended a phase-in of 40/80/100 percent of their boats in the 2011 through 2013 model years.[3] When this approach was presented to EPA, it was also supported by NMMA and Genmar, who were in attendance. Brunswick commented that this phase-in was necessary for three reasons. First, they (and other large boat builders) have a large number of boat models that are independently designed and produced under individual brands. Brunswick commented that these brands, in many ways, each operate similar to a smaller business. Second, some of the boat designs have very limited space for the installation of canisters and would need substantial design changes, and therefore require more time. Third, Brunswick commented that a phase-in of the standards would allow them to better balance the demand for engineering resources.

We also received comments regarding additional lead time for small businesses. This issue is discussed in Section 4.9, below.

Letters:

Commenter	Document #
NMMA	0688
Environmental Defense	0648
Yamaha	0721
Suzuki	0698
California ARB	0682
U.S. Coast Guard	0631
Delphi	0638
Trident Rubber	0636
Inca Molded Products	0700
NMMA (hearing)	0642
ABYC (hearing)	0642
Sea Ray	0683
S2Yachts	0697
Grady-White Boats	0677
North American Sleekcraft	0666
Triton	0656
Lund Boat Co	0655
Brunswick Corporation	0695
Brunswick Commercial and Government Products	0652
Lowe Boats	0660
Godfrey	0645
American Marine Sports	0639
Cigarette Racing	0637
Regal Marine Industry	0635
Massachusetts Marine Trade Association	0634
Regulator Marine Inc.	0632
Ranger Boats	0628

[3] Brunswick Boat Group, "Brunswick Boat Group Diurnal Emission Controls," Presentation to U.S. EPA, April 4, 2008.

Larson/Glastron Boats	0626
Four Winns Boats	0650
Premier Marine Inc,	0613
Skeeter	0706
Yellowfin	0681
NMMA	0739
Grady-White	0750
Four Winns	0625

Our Response:

We are finalizing the diurnal emission standards, as proposed, for installed fuel tanks. In addition, we are finalizing provisions to allow for design-based certification to the diurnal emission standard. Due to the large variation in boat designs, we believe that design-based certification is valuable tool for reducing testing burden. To certify their products using design-based certification, manufacturers will describe, from an engineering perspective, how their fuel systems meet the applicable design specifications. We believe there are several designs that use established technologies that are well understood to have certain emission characteristics. At the same time, while design-based certification is a useful tool for reducing the test burden associated with certification, this does not remove a manufacturer's liability for meeting all applicable requirements throughout the useful life of the engine, equipment or vessel.

The primary evaporative emission control device used in automotive applications is a carbon canister. With this technology, vapor generated in the tank is vented to a canister containing activated carbon. The fuel tank must be sealed such that the only venting that occurs is through the carbon canister. This prevents more than a minimal amount of positive or negative pressure in the tank. The activated carbon collects and stores the hydrocarbons. The activated carbon bed in the canister is refreshed by purging. This same basic technology may be used in marine applications as well. However, in a marine application, an engine purge is less practical than in automotive applications because of the potential complications with the engine and tank created by the variety of manufacturers and engine/tank configurations in the fleet each year. In addition, boat engines are not operated as regularly as automotive engines, causing extended periods between active purges. Even without an active purge, carbon canisters may be used to significantly reduce diurnal emissions because the canister is purged sufficiently during cooling periods ("passive purge"). When the fuel in the tank cools, fresh air is drawn back through the canister into the fuel tank. This fresh air partially purges the canister and returns hydrocarbons to the fuel tank. This creates open sites in the carbon so the canister can again collect vapor during the next heating event. A passively purged canister is capable of reducing diurnal emissions by more than 60 percent due to the normal airflow across the canister bed during cooling periods.

If a manufacturer uses a canister-based system to comply with the standard applicable to the specific tank, we are also requiring that manufacturers design their systems not to allow liquid gasoline to reach the canister during refueling or from fuel sloshing or volume expansion. Liquid gasoline will significantly degrade the carbon's ability to capture hydrocarbon vapors.

Currently, industry consensus standards in ABYC H-24[4] address, to some extent, spillage during refueling and due to fuel expansion. However, under these guidelines, the refueling "blow back" test is only for a partial fill and does not necessarily prevent fuel from spilling out the vent line (where a canister would likely be installed) during refueling. In addition, although ABYC recommends that a fuel system be designed to contain 5 percent fuel expansion, the actual requirement can be met by the manufacturer by simply lowering the fuel tank capacity rating without designing the fuel system to prevent overfilling. We do not believe that a system that simply meets the current ABYC requirements would necessarily be adequate to demonstrate that liquid fuel would not reach the carbon canister. However, ABYC commented that it intends to revisit its standards to include proper canister installation instructions and an improved fuel spillage performance test. One example of an approach to protect the canister from exposure to liquid gasoline is a design in which the canister is mounted higher than the fuel level and a small orifice or a float valve is installed in the vent line to stop the flow of liquid gasoline to the canister.

There was a range of several years in the commenter's opinions on the proper implementation date for marine diurnal emission standards. The recommended implementation date ranged from the 2009 model year to a three-year phase-in from 2011 through 2013. At this point, many manufacturers are producing their 2009 model boats already; therefore a 2009 model year implementation date is clearly too early. Personal watercraft currently use sealed fuel systems for preventing fuel from exiting, or water from entering, the fuel tank during typical operation. These vessels use pressure-relief valves for preventing excessive positive pressure in the fuel system; the pressure to trigger the valve may range from 0.5 to 4.0 psi. Such a fuel system also uses a low-pressure vacuum relief valve to allow the engine to draw fuel from the tank during operation. Because we do not expect significant engineering changes for these vessels, we are implementing the diurnal emission standards, for PWC, beginning with 2010 model year.

Vessels with installed fuel tanks are typically designed with open vent systems. In their comments, marine vessel manufacturers expressed general support of the feasibility of using carbon canisters on boats. In addition, the marine industry has expressed an interest in developing consensus standards for the installation of carbon canisters in boats. However, they commented that the development of these consensus standards will take time and that a phase-in would be needed for an orderly transition with regard to installing diurnal emission controls across their product lines. We recognize that canister technology has not yet been applied commercially to marine applications and additional lead time may be necessary to work out various technical parameters associated with the large variety of boat models and tanks. Many boat designs have ample space, within hull, to allow for canister installation without significant mold changes. However, we believe that that a one year phase-in approach will give boat builders the flexibility they need to balance their engineering resources and to address any boat designs with limited space for the installation of canisters. Therefore, for fuel tanks installed on vessels, we are finalizing a phase-in beginning on July 31, 2011. In the period from July 31, 2011 through July 31, 2012, 50 percent of the boats produced by each company must meet the

[4] American Boat and Yacht Council, "Standards and Technical Information Reports for Small Craft; H-24 Gasoline Fuel Systems," July, 2007.

diurnal standard described above. Beginning on August 1, 2012, all marine fuel tanks and boats must meet the diurnal emission standard.

We did not propose running loss or diffusion standards for marine vessels. Installed marine fuel tanks are generally not mounted near the engine or other heat sources so running losses should be very low. A possible exception to this is for personal watercraft or other small boats where the fuel tank may be closer to the engine. However, under the new standard for controlling diurnal emissions, we expect that PWC manufacturers will design their fuel tanks to stay pressurized up to 1 psi. This will also help control running loss emissions. The use of a carbon canister will also help control diurnal emissions for other installations where the fuel tank may be near the engine. The same passive purge phenomenon that limits venting emissions caused by diurnal tank heating would limit venting emissions from fuel tanks heated by engine operation. Any increase in fuel temperature resulting from engine operation will cause a potential for fuel tank vapor emissions that are generated in a manner similar to fuel tank diurnal emissions. We are therefore not allowing manufacturers to disable their approaches for controlling diurnal emissions during engine operation. This will ensure that any running loss emissions that will otherwise occur will be controlled to a comparable degree as diurnal emissions. In addition, we believe the diurnal emission standard will lead manufacturers to adopt technologies that automatically limit diffusion losses, so there is no need to set a separate diffusion standard for those systems.

4.3.8 Diurnal – portable fuel tanks

What Commenters Said:

Suzuki expressed support of the proposed concept of a diurnal requirement for portable fuel tanks that requires they be equipped with self-sealing gas caps up to a internal pressure of 5.0 psi, and that the tanks must be self sealing when they are disconnected from the outboard engine. Suzuki commented that the requirement is technically feasible given sufficient lead-time. They argued that compliance with this all-new requirement will require the development of new components, which must also be validated to ensure proper function and durability in all market conditions. Suzuki and NMMA requested that EPA adopt an implementation date of the 2011 model year for the portable fuel tank diurnal requirement to allow for the lead time needed to develop the new components.

Letters:

Commenter	Document #
NMMA	0688
Suzuki	0698

Our Response:

The design standard for portable marine fuel tanks can be met with relatively straight-forward technology. These fuel tanks are already designed to withstand the pressure of being stored in a sealed condition, which may lead to pressures substantially larger than 5.0 psi. The manual valve simply needs to be replaced with an automatic pressure/vacuum-relief valve such as have been used in other fuel system applications for decades. In addition, the hose connections are typically designed to seal when the tank is disconnected from the engine, even in today's designs. However, we recognize that some additional lead time may be necessary for the development and validation of new components. Therefore we are providing an additional year of lead time beyond the proposed implementation date. Specifically, we are implementing the new diurnal standards for portable marine fuel tanks in 2010. We believe these requirements will not result in a significant change from current practice so this date will provide sufficient lead time for manufacturers to comply with standards.

4.3.9 Diurnal – engine-mounted fuel tanks

What Commenters Said:

NMMA expressed support of the proposed diurnal requirements for engine-mounted fuel tanks. NMMA stated that, in the case of engine-mounted fuel tanks, compliance with the proposed diurnal standard is feasible through the use of pressure-sealing gas caps. However, NMMA noted that components that can meet these specifications must still be developed. Given the state of the technology, NMMA recommended that any diurnal requirements for very small engine-mounted tanks be delayed until model year 2011. Yamaha also expressed support EPA proposal to control diurnal emission loss from engine mounted fuel tanks in 2011.

Letters:

Commenter	Document #
NMMA	0688
Yamaha	0721

Our Response:

We agree that the diurnal requirements can be met for engine-mounted fuel tanks, through the use of sealed systems with pressure relief valves. However, we recognize that some additional lead time may be necessary for the development and validation of new components. Unlike portable fuel tanks, these tanks are not currently designed to be sealed for storage. Therefore we are providing two additional years of lead time beyond the proposed implementation date. Specifically, we are implementing the new diurnal standards for engine mounted fuel beginning on July 31, 2011.

4.4 Averaging, banking, and trading

What Commenters Said:

EMA and OPEI commented that ABT programs provide important flexibility and incentive to regulated parties, and are a major contributing factor to the creation of a balanced and effective regulatory program. ABT programs generate a substantial amount of emissions reduction over and above reductions effected by regulation, at a low cost to regulated parties. EMA and OPEI supported the need for a nonhandheld fuel tank ABT program. They both commented that it is imperative that the evaporative AB&T program included in the final rule is designed to generate the greatest environmental benefit possible. In order to take full advantage of this mutually beneficial opportunity to achieve greater emissions reductions, EPA must ensure that the AB&T program incorporated into the final rule is both effective and viable.

OPEI supported the proposed ABT program for handheld fuel tanks and fuel lines. OPEI also supported the continuation of the handheld fuel tank ABT program after the implementation of the FEL caps. OPEI did not support the use of an ABT program for service tanks. They noted that no controls exist for the manufacture and sale of replacement tanks and the market could be flooded with unneeded and unnecessary parts for the sake of credit generation.

EMA commented that fuel lines should not be included in the fuel tank permeation AB&T program. As a result, the temperature difference between the fuel line permeation test and the fuel tank permeation test should not be a concern. In addition, the 23ºC test temperature for fuel line is a well established industry standard that provides consistency throughout the fuel line industry regardless of final product application/regulation.

EMA commented on §1054.706 "How do I generate and calculate evaporative emission credits?" They believe the ability to generate credits should be extended to engine manufacturers for engines sold with integrated fuel systems that include fuel tanks.

EMA commented on §1060.130(b)(5) "What installation instructions must I give to equipment manufacturers?" The evaporative ABT program should be limited to OEM and engine manufacturers. Allowing component manufacturers to participate in ABT creates incredible complexity.

EMA noted that the proposed ABT program does not allow the use of presumptively compliant materials, such as steel or multi-layer plastics (that will generate significant environmental benefit), to generate credits. EMA presumed the constraint on the credit generating benefits of these very low emitting materials is based on a concern that existing tanks would generate emission credits even though those benefits already are included in the baseline emission inventory analysis. EMA recommended that EPA allow these very low emitting products to generate emission credits if they are used to replace existing high permeation materials.

Letters:

Commenter	Document #
OPEI	0675
EMA	0691

Our Response:

EPA is retaining an evaporative emission ABT program for nonhandheld fuel tanks in the final regulations. EPA believes such a program will provide flexibility for equipment manufacturers to comply with the new fuel tank permeation requirements for nonhandheld equipment.

EPA is making some changes to the proposed evaporative emission ABT program for handheld equipment. These changes are in response to changes made in the final regulations regarding cold weather fuel lines and structurally integrated fuel tanks for handheld equipment. (See sections 4.2.3 and 4.2.5 for information on those changes.) First, the evaporative emission ABT program for handheld equipment will no longer allow credits to be exchanged between fuel tanks and fuel hose. Instead, there will be one ABT program for fuel tanks used in handheld equipment and a second temporary ABT program for fuel lines used in cold-weather equipment. Without changes to the proposed handheld fuel tank and fuel hose ABT program, EPA is concerned that manufacturers would likely have been able to keep their existing cold-weather fuel lines without making any improvements to those designs. This was not the intent of the proposed program. In response, EPA is adopting a temporary fuel line averaging program for cold-weather equipment. Manufacturers would not be allowed to bank or trade credits under the cold-weather fuel line program. As described in Section 4.2.3, EPA believes that cold-weather fuel lines present unique challenges and limitations with regard to permeation control. Given the declining set of standards EPA is adopting for cold-weather fuel lines, the temporary cold-weather fuel line averaging program will provide manufacturers with the ability to redesign their cold-weather fuel lines to meet lower permeation levels in an efficient and timely manner. The cold-weather averaging program will no longer be available in the 2016 model year when all cold-weather fuel lines will need to demonstrate compliance with a 225 $g/m^2/day$ standard. With regard to other types of handheld equipment, EPA believes that manufacturers should be able to meet the fuel line permeation standard of 15 $g/m^2/day$ without the need for credits and is therefore not including those fuel lines in the temporary fuel line averaging program.

The second change to the ABT program for handheld equipment is in regard to the provisions for structurally integrated fuel tanks. As described in Section 4.2.5, EPA is finalizing a 1.5 $g/m^2/day$ standard for all handheld fuel tanks, instead of the slightly higher proposed level of 2.5 $g/m^2/day$ for structurally integrated fuel tanks. Therefore, handheld equipment manufacturers will generate and use credits for any fuel tank based on the standard of 1.5 $g/m^2/day$, including structurally integrated fuel tanks. As proposed, the evaporative emission ABT program for handheld equipment will allow manufacturers to use credits across all three classes of handheld engines/equipment.

In response to the comments on allowing engines manufacturers to participate in the evaporative ABT program, EPA agrees that engine manufacturers should be able to participate in the ABT program if they assemble the entire fuel system along with the engine. EPA believes it makes sense because the engine manufacturer is expected to be the entity certifying their engine/fuel system to the evaporative standards in these situations and not the equipment manufacturer (such as with handheld engines or personal watercraft). EPA expects this will generally be the case with the large majority of Class I nonhandheld engines as well as nearly all handheld engines. Therefore, the regulations have been revised to allow engine manufacturers that provide the complete fuel system with the engine to participate in the ABT program. It should be noted that if an engine manufacturer participates in the evaporative ABT program for a given engine/fuel system, then the equipment manufacturer who purchases those engines/fuel systems cannot generate its own credits for those products (or would not have to use its own credits for those products either). That would be double-counting of credits.

With regard to the comments on including component manufacturers (i.e., tank manufacturers) in the ABT program, EPA is retaining the provisions as proposed. Tank manufacturers that certify their fuel tanks with EPA can participate in the ABT program. However, their participation is limited to selecting the appropriate FEL for their tank design. The tank manufacturer cannot generate credits in the ABT program. Only equipment manufacturers (or engine manufacturers that provide a complete fuel system with the engine) may earn/use credits and demonstrate compliance under the evaporative ABT program. EPA believes it is appropriate to allow tank manufacturers to participate in the ABT program in this manner to facilitate the use of the ABT program by equipment manufacturers who generally rely on outside sources for their fuel tanks and are required to demonstrate compliance with the overall evaporative requirements for their equipment.

In regard to the comment on service/replacement tanks, EPA agrees it is not appropriate to include such tanks in the ABT program. Equipment manufacturers will be required to demonstrate that their equipment models meet the evaporative emission standards. If the certified equipment uses a fuel tank included in the ABT program, the credits generated were based on a useful life of five years. Therefore, if the tank being replaced is less than five years old, the replacement tank would result in double counting of some of the credits. While manufacturers could potentially gather information to account for the age of the fuel tank being replaced, EPA does not want to complicate the provisions of the ABT program and is therefore not allowing replacement tanks to be included in the ABT program.

With regard to the comments on steel tanks, EPA is retaining the provisions for metal tanks as proposed. Metal tanks will not be included in the ABT program. While EPA acknowledges that these tanks would have permeation rates well below the standard, there is extensive use of metal tanks today. We believe it would be difficult to allow these emission credits without undercutting the stringency of the standard and the expected emission reductions from the standard. Therefore, we are not allowing metal tanks to be included in the ABT program.

With regard to multi-layer tanks, EPA did propose to allow such tanks to participate in the evaporative emission ABT program under a specified condition. To participate in the ABT program, a manufacturer must establish an FEL for the multi-layer fuel tank based on an actual measurement of permeation emissions. EPA is retaining that provision for the final rule. However, it should be noted that manufacturers that certify their multi-layer tanks by design cannot include those tanks in the ABT program.

4.4.1 Averaging sets

What Commenters Said:

EMA and OPEI commented that cross-class trading restrictions are generally not beneficial. Because the tank permeation standards are in terms of grams per square meter, EMA and OPEI believe the relative tank size between Class I and Class II should not impact competitive market or technology development.

EMA commented that cross category trading between Small SI and marine could create a significant competitive market issue and should not be allowed.

OPEI commented that trading between handheld and non-handheld should be restricted except as proposed in §1054 subpart H.

Honda commented that EPA should clarify in the final rule when and if an engine less than 80cc would be categorized as nonhandheld for ABT purposes if EPA does not allow Phase 3 cross class averaging. Clarification or added guidance in the final rule would be useful where an engine less than 80cc is used in a nonhandheld product would qualify as nonhandheld for purposes of ABT, such as an engine used in a ground-supported mini-tiller. **(Also included in Section 2.3.2)**

Letters:

Commenter	Document #
OPEI	0675
EMA	0691
Honda	0705

Our Response:

EPA is retaining the averaging sets for the evaporative emission ABT programs as proposed, with one change for nonhandheld equipment. As proposed, EPA will not allow averaging of emissions between Marine SI vessels and Small SI equipment. In the Marine SI evaporative emission ABT program, EPA will allow averaging of emissions between OB/PWC vessels and SD/I vessels. (Portable marine fuel tanks are not included in the Marine SI evaporative emission ABT program.) In the Small SI evaporative emission ABT program, EPA will not allow averaging of emissions between handheld equipment and nonhandheld equipment.

For the nonhandheld evaporative emission ABT program, EPA is dropping the restriction on averaging between Class I and Class II equipment. In the proposal, EPA noted concerns that trading across the categories could give an unfair competitive advantage to manufacturers with broad product lines. However, given that the trade organization representing equipment manufacturers does not believe the restriction is necessary due to competitiveness concerns, EPA is less concerned about the need for the restriction. Furthermore, because EPA is adopting FEL caps for the fuel tanks, manufacturers eventually will be required to design all of their tanks to comply with the permeation standards. This also lessens our concerns about manufacturers using the ABT program to their advantage in the marketplace since all fuel tanks will need to employ some level of permeation control. Therefore, we are dropping the restriction on trading of evaporative emission credits across Class I and Class II equipment. (It should be noted that the proposed restriction between Class I and Class II equipment in the early allowance programs will still apply. EPA believes this restriction is still appropriate because there is no adjustment in the early allowance program for the size of the fuel tank, unlike the ABT program in which credits are calculated based on the surface area of the tank.)

In regard to the comments on whether engines certified to the handheld standards can generate nonhandheld credits, EPA proposed to allow manufacturers to generate nonhandheld ABT credits from equipment powered by engines at or below 80cc (which are subject to the handheld standards) if a manufacturer has determined the application is a nonhandheld application. A nonhandheld application is an application that does not meet the handheld definition as defined in §1054.801 of the regulations. EPA is retaining that provision in the final rule. Therefore, a manufacturer can generate nonhandheld emission credits from equipment powered by engines at or below 80cc that are subject to the handheld evaporative standards if the manufacturer determines the equipment is actually a nonhandheld application. These nonhandheld credits could be used within Class I and Class II to demonstrate compliance with the evaporative emission standards.

4.4.2 Early Credits

What Commenters Said:

NMMA noted that EPA proposed an early credit system for companies subject to the evaporative emissions standards in Part 1060. Under the program, manufacturers certifying early to the fuel tank permeation standards would be able to earn allowances that they could use to offset high-emitting fuel tanks at a later date. No cross trading between portable fuel tanks, PWC, and other installed fuel tanks would be permitted. For PWC and portable fuel tanks, allowances could be earned for compliant tanks installed prior to 2011 and could be used through the 2013 model year. For other installed tanks, allowances could be earned for compliant tanks installed prior to 2012 and could be used through the 2014 model year. NMMA commented that it appreciates EPA's efforts to provide flexibility and reward early compliance with the proposed standards. However, NMMA noted that an early credit program should not serve as a substitute for additional time for compliance with the new standards. (As noted in Section 4.3.5, NMMA submitted comments noting that its members have serious reservations about imposing a 2012 compliance deadline for rotational-molded tanks. To address these concerns, NMMA recommended that EPA perform a technical review in 2010 and impose an implementation date based on the findings.)

Letters:

Commenter	Document #
NMMA	0688

Our Response:

EPA is retaining the early compliance program for Marine SI fuel tanks as proposed. EPA believes the early compliance program will encourage the early introduction of low permeation products and will provide vessel manufacturers with additional flexibility as they transition to the new standards. (With regard to the 2012 compliance deadline for rotational-molded tanks, as noted in Section 4.3.5, EPA intends to hold periodic progress reviews with small businesses that manufacture rotation-mold fuel tanks. The purpose of these progress reviews will be to monitor the progress of individual companies towards compliance with the tank permeation standards and to provide feedback as needed.)

4.4.3 Credit Lifetime

What Commenters Said:

OPEI opposed the proposition that any engine-exhaust or evaporative credits generated by a manufacturer should have an arbitrary life period. Emission credits are either generated through the voluntary early implementation of new emission control technology or introduction of products that are cleaner than required by the applicable emission standard. They noted that such credits are generated at a cost to the manufacturer, and are granted in exchange for the manufacturer's independent decision to produce products that provide additional benefits to the environment. These credits are important assets that should not be arbitrarily lost due to time or actions not under the manufacturer's control.

EMA also commented that banked emission credits should not have a limited life. The credits were generated based on a product that was sold and provided environmental benefit relative to the requirement. Whether or not that piece of equipment is still in use is immaterial, since the benefit was already provided.

Letters:

Commenter	Document #
OPEI	0675
EMA	0691

Our Response:

EPA does not believe a limit on the life of the credits is needed at this time for the evaporative emission ABT programs adopted with this rule. While EPA is adopting an indefinite credit life for the ABT program, manufacturers should not assume that this means those credits will be available without any restrictions on their use if, or when, EPA should consider a new round of evaporative emission standards in the future. As part of any future rulemaking, EPA would expect to consider ways to ensure that the evaporative emission ABT credits existing at that time would not result in a delay of any future standards that would prevent us from requiring the greatest degree of achievable emission reductions.

4.4.4 FEL caps

What Commenters Said:

In response to EPA's proposal to set an FEL cap for fuel tanks after the program has been in effect for three years, OPEI and EMA commented that because there was not previously a control standard from which to determine an FEL cap, it is not appropriate to now assign an arbitrary FEL cap. Implementation of an FEL cap at any time during Phase 3 precludes the option for manufacturers to continue to utilize existing technologies for low volume products that do not justify the design, development, or capital expense associated with the implementation of prescribed emission controls. If a manufacturer can either generate or trade for sufficient credits to continue the use of relatively high emission level pre-compliance products the ABT program should not preclude them from doing so.

In response to EPA's request for comment on the usefulness of an ABT program after we implement an FEL cap, OPEI and EMA supported the continued need for an ABT program and commented that an FEL cap without an ABT program would not allow the flexibility required by manufacturers. They noted that it is not clear how a product could be certified to any level other than the prescribed standard without an ABT program irrespective of the use of an FEL cap.

EMA and OPEI commented that the proposed alternative FEL cap associated with testing at 40°C is not equivalent to the FEL cap at 28°C. The averaged results for Fuel C and Fuel CE10 predict that the permeation rate will increase by a factor of 2 between 28°C and 40°C. If an FEL cap is required, they commented that the alternative caps prescribed at 40°C should be changed to be 2 times the cap at 28°C in order to provide equivalent stringency. Therefore, the alternative FEL cap at 40°C should be changed to 10.0 g/m^2/day to be equivalent stringency as the 28°C cap (and 6.0 g/m^2/day for structurally integrated nylon tanks and 16.0 g/m^2/day for small-volume manufacturers).

OPEI noted that they agree with the proposed FEL caps for handheld engines/equipment. In addition, OPEI requested that EPA consider an FEL cap of 5.0 g/m^2/day for structurally integrated tanks since the higher cap would not result in any increase in emissions when using the ABT program.

Letters:

Commenter	Document #
OPEI	0675
EMA	0691

Our Response:

With regard to the comments on whether EPA should have an FEL cap for fuel tanks when there is no previous standard, EPA is retaining the FEL caps as proposed (with one change for structurally integrated fuel tanks as described below). EPA believes that equipment and vessel manufacturers eventually should be required to apply low-permeation technology to all of their fuel tank designs. In the short term, we would not have FEL caps for the fuel tanks. However, starting in 2015 for handheld equipment and Class I equipment, 2014 for Class II equipment, 2014 for PWC, and 2015 for installed marine fuel tanks, the FEL cap would apply. Therefore, manufacturers could continue using current uncontrolled fuel tank designs for the first few years, provided they have sufficient credits to offset the higher permeation levels from those fuel tanks. However, starting with the dates noted above, manufacturers would need to employ low-permeation technologies on all of their equipment. Given the FEL cap of 5.0 g/m^2/day (or 8.0 g/m^2/day Small SI small volume families), manufacturers would still need to improve their existing tank designs, but they may be able to employ simpler, less expensive technologies that meet the FEL cap (but not the 1.5 g m^2/day standard) such as thicker walled fuel tanks.

With regard to the comments on the level of the FEL caps for the alternative permeation standard at 40ºC, EPA is retaining the FEL caps for the higher temperature testing as proposed. The higher temperature permeation standards have been included in this rule as an alternative standard because manufacturers that wish to certify with California ARB are required to perform fuel tank testing at 40ºC and EPA wanted to provide a means for manufacturers to use that information for certifying with EPA. Based on permeation results from fuel tanks tested at 28ºC and 40ºC, EPA has seen a range in the effect of temperature on permeation emissions depending on the fuel tank material. Therefore, in selecting the FEL caps for the higher temperature alternative standard, EPA has selected a limit that provides a high level of confidence that the fuel tank would also comply with the FEL cap associated with the testing at the normal testing conditions of 28ºC. For the available data representing a range of materials and control technologies, the selected FEL caps for high-temperature testing represent the value that corresponds to a relatively worst-case condition for taking compliant products tested at 40°C and showing that they would also comply when tested at 28°C.

With regard to the FEL cap for structurally integrated tanks, EPA is revising the FEL cap for structurally integrated fuel tanks. As described in Section 4.2.5, EPA is finalizing the same permeation standard for structurally integrated fuel tanks as for all other tanks. Therefore, EPA believes it is appropriate to apply the same FEL cap of 5.0 g/m^2/day to structurally integrated fuel tanks (or 8.0 g/m^2/day Small SI small volume families) that would apply to all other fuel tanks.

4.4.5 Other ABT Issues

What Commenters Said:

OPEI supported the credit adjustment for the effect of different test temperatures on fuel tank permeation measurements.

OPEI commented that paragraph 1054.706(b) is confusing and EPA's intent is not understood. For example if an FEL of 4.5 g/m^2/day is used for a tank, paragraph (b)(1) says it is not allowed, yet such an emission level is allowed under paragraph 1054.110(b). OPEI suggested that paragraph (b)(1) be deleted. In addition, paragraph (b)(2) should be revised to reflect that if a manufacturer chooses not to test they could use a default level of 10.4 g/m^2/day.

OPEI commented that the calculation of emission credits for structurally integrated tanks in paragraph 1054.706(c) is based on levels established for testing at 28ºC. The last two lines need to be revised to reflect the calculation of positive credits for a standard of 2.5 g/m^2/day at 40ºC and the calculation of negative credits at a level of 4.0 g/m^2/day when tested at 40ºC.

EMA commented on §1054.706(a) "How do I generate and calculate evaporative emission credits?" They believe the final regulations need more detail regarding how the "Total Area" is calculated. EMA recommended that "Total Area" should be calculated by multiplying the projected domestic sales volume with internal surface area of each fuel tank design within a family.

EMA commented on §1054.706(b)(1) "How do I generate and calculate evaporative emission credits?" They believe the requirement to measure emissions from every tank without an FEL is not appropriate. A manufacturer should have the option to measure permeation from the worst case tank, as determined using good engineering judgment.

EMA commented on §1054.715(b) "How do I bank emission credits?" They believe reserve credits cannot be traded. Therefore, EMA recommended that the reference to "trading" should be deleted from this section. **(Also included in 2.3.5)**

EMA commented on §1054.725(b)(2) "What must I include in my application for certification?" They believe engine families that generate or use credits at the time of certification should not be required to designate their credit destination or origin within the averaging set. **(Also included in 2.3.5)**

EMA commented on §1054.730(f)(3) "What ABT reports must I send to EPA?" They believe that if an error mistakenly increases a manufacturer's balance of emission credits, correction of the errors and recalculation of the balance of emission credits should be undertaken at the manufacturer's discretion. Manufacturers should not be required to correct the errors and recalculate the balance of emission credits as currently proposed. **(Also included in 2.3.5)**

EMA commented on §1054.735(d) "What records must I keep?" They believe the requirement to keep additional records for each engine or piece of equipment including the engine identification number, build date and assembly plant is excessive and beyond the current requirements of 40 CFR Part 90.209. These additional record keeping requirements either should be deleted or replaced with engine manufacturer records associated with products produced. **(Also included in 2.3.5)**

EMA commented on §1054.735(e) "What records must I keep?" They believe that this section, as drafted, appears to be arbitrary and capricious. EPA should not be allowed to require manufacturers to keep additional unspecified records or demand additional information not required by the rule without a proper purpose or for cause. EPA should be required to support any imposition of additional record keeping requirements or demand for additional information with specific and appropriate reasons. Further, such decisions should not be made unilaterally by EPA, and the manufacturer must have the ability to question any such request and, if necessary, request a formal hearing process. **(Also included in 2.3.5)**

Letters:

Commenter	Document #
OPEI	0675
EMA	0691

Our Response:

Regarding the comment on the adjustment to credit calculations for the effects of temperature, EPA is adopting the adjustment as proposed. Manufacturers earning credits based on the alternative standard at a higher temperature of 40ºC will apply a factor of 0.6 to determine the number of credits they generate or use.

EPA agrees that additional language should be added to the regulations to clarify that credits are based on the total internal surface area for all fuel tanks in the emission family. This would be calculated by multiplying the production volume of each fuel tank design by its internal surface area and adding each of the resulting values together.

EPA has revised the language regarding the fuel tank FEL language in §1054.706(b) to clarify the original intent of the proposal. The revised language provides two options to manufacturers for the tanks included in the ABT program. Manufacturers can establish FELs for each of their fuel tank families based on permeation testing of each tank design. Alternatively, manufacturers may establish FELs for all of their "controlled" fuel tanks (i.e., those tanks for which the manufacturer has applied some type of low-permeation technology or material and presumed to have an FEL of less than 5.0 g/m^2/day) and assume an FEL of 10.4 g/m^2/day for all remaining "uncontrolled" fuel tanks. Manufacturers are not allowed to pick and choose which uncontrolled fuel tanks they want to test. They either must test all of the uncontrolled tank designs (and establish an FEL for each tank design based on the results) or they must assume an FEL of 10.4 g/ m^2/day for each uncontrolled tank design. If a manufacturer wants to test their uncontrolled fuel tanks, EPA believes the manufacturers must test all of them and not just a "worst-case" tank design, since it may difficult to justify which design is truly the "worst-case" among the uncontrolled tanks.

EPA has deleted the paragraph regarding the comments on the calculation of credits for structurally integrated fuel tanks in §1054.706(c). As noted in Section 4.2.5, EPA has deleted the separate standards for structurally integrated fuel tanks from the final regulations. Therefore, the information in paragraph (c) of §1054.706 is no longer needed.

For the remaining comments on §1054.715(b), §1054.725(b)(2), §1054.730(f)(3), §1054.735(d), and §1054.735(e), EPA responded to these comments in Section 2.3.5 of this document since the comments also applied to the exhaust ABT program for Small SI engines. The reader is directed to that discussion for a response to these comments.

4.5 Other requirements

4.5.1 Refueling– Marine SI

What Commenters Said:

Enviro-Fill described the extent of the problem related to refueling spillage from marine vessels. While there are no known studies that accurately quantify the problem, there are plenty of articles documenting how extensive the fuel spill problem is. Enviro-Fill referenced letters from fuel dock operators and boat owners supporting changes that would reduce the occurrence of refueling spillage. One operator stated that the majority of the boats refueled at his marina spill through the vent.

Enviro-Fill observed that there are regulations and standards in place for building boats. US Coast Guard regulations are mandatory while ABYC's specifications are followed voluntarily. This system seems to work; however, there are some shortcomings in the standards. ABYC's standard (H-24) allows a manufacturer to rate a fuel tank, for example, at 21 gallons even though the tank can hold 26 gallons. The extra capacity is considered to be for expansion. However, an operator will typically fill the tank to 26 gallons, leaving no room for expansion.

As this fuel warms and expands, five percent of the volume (1.3 gallons) could be expelled from the tank. ABYC or EPA need to adopt standards and procedures that properly test marine refueling systems to require designs that prevent spillage. A proper arrangement would be for automatic refueling shutoff to occur at fill rates between 5 and 20 gallons per minute such that no spitback or spillage occurs and five percent of tank volume is reserved for expansion. Such a solution would comply with section 311 of the Clean Water Act, which states that it is illegal to dump any petroleum product in the waters of this country.

Enviro-Fill stated that they have developed a technology to prevent spitback, spillage, or overfill when refueling boats. The technology senses the fuel level in the tank and activates the nozzle shutoff automatically when the fuel level reaches a predetermined level. An independent laboratory tested the prototype system by filling a tank 25,000 times at 15 gallons per minute, allowing the system to shut off the nozzle each time without spilling any fuel and without filling the tank past the 95 percent fill level. This would require hardware changes to the fuel tank and filler neck (not the hull or deck) for an estimated total cost of $100, though that cost impact may be reduced to the extent that other components may no longer be needed. There would also be cost savings from no longer spilling fuel or cleaning up the spilled fuel.

Enviro-Fill's technology keeps fuel from entering carbon canisters without a check valve. This technology depends on a standardized fuel nozzle, so they recommend that EPA adopt the nozzle specifications described in the proposed rule on the same schedule as the other requirements in the rule. Enviro-Fill recommended a nominal spout diameter of 1.187 inches because that size is commonly found at marinas today.

NMMA suggested that EPA's proposed provision requiring vessel designs that allow an operator to reasonably expect to fill fuel tanks without spitback or spillage completely fails to take into account how different marine refueling is from other industry segments. For example, there are countless combinations of vehicles and trailers, which create numerous different fill angles. In addition, the need for an "open" system as well as specific installation locations for both fill and vent openings make an industry standard difficult to establish. Apart from the fuel system, there are a number of other variables that the boat builder cannot control that have a direct impact on whether the fuel system can perform automatic shutoff and reduce spitback and spillage. These challenges cannot be overcome by the boat builders alone. For example, the nozzles in use at marinas are not standardized nor are they equipped with an automatic shutoff feature. The unique fuel dispensing needs of boat fuel systems are another huge challenge. A gallon-per-minute (gpm) fuel dispensing restriction like that in place at retail gas stations to reduce spitback and spillage would not work for tanks that hold hundreds of gallons of fuel. EPA suggests a fill rate restriction between 5 to 20 gpm. A limit of 10 gpm, which is required at retail gas stations, would mean that a boat with a 300 gallon tank would have to wait 30 minutes to refuel. This is just not practical for refueling at a marina.

NMMA chided EPA for incorrectly citing the ABYC standard for refueling and misstating its requirements (NMMA cited no specific errors and offered no corrections). NMMA also pointed out that EPA failed to mention that there is an ABYC technical committee currently working to address the technological issues associated with the H-24 standard and refueling practices. For all of these reasons, any requirements for refueling in the marine context requires further analysis and discussion with ABYC to ensure the development of a comprehensive regulatory regime that addresses all the necessary parameters and variables. EPA must defer requirements addressing spitback and spillage until the necessary technological challenges can be resolved. NMMA recommends that ABYC be given three years to develop appropriate refueling standard practices and then provide industry with two model years of lead time for implementation.

ABYC noted that vessel attitudes can vary dramatically during refueling and during operation, which increases that likelihood that liquid fuel will get into vent lines. Fill and vent openings on current boats must be located such that any fuel spilled, either from the filler neck or the vent, will not spill into the boat, which would create a grave fire and explosion hazard. Current recreational boats therefore are designed to route spills and overflows overboard, minimizing the fire and explosion risk (while contributing to water and atmospheric pollution). All these factors combine to make it impossible to simply adopt the automotive model in the marine market. ABYC is encouraging open and frank discussions among Project Technical Committees and comparable ISO Working Groups to develop a solution to spills caused by refueling or venting. This will be a long road and will likely result in substantive re-design of fuel systems to prevent and/or contain spills while still complying with established federal regulations.

Sea Ray chimed in to say that EPA needs to recognize that standardization of fuel filler nozzles and fuel flow rates at marinas must be addressed before boat builders can design for compliance.

Environmental Defense stated that EPA's proposed requirement to produce vessels designed to prevent spills during refueling provide manufacturers with ample flexibility in choosing designs consistent with good engineering practices to reduce refueling and spillage emissions. Such design changes could include fuel inlets that allow consumers to see rising fuel levels during refueling and automatic shutoff devices. They support EPA's proposal to reduce refueling spillage and spitback emissions as an important step in protecting human health and the environment.

Inca Molded Products objected to the proposed regulatory provision related to preventing refueling emissions in §160.101(f)(3). There has not been time to evaluate the impact of this requirement to know what safety or performance issues might arise. Standardized nozzles and automatic shutoff would be necessary to implement for refueling controls can be implemented, and a 10 gallon-per-minute limit is not reasonable for marine vessels. It would also take time to design, test, and produce the components needed to address all the different penetration, attachment, and sealing techniques needed for the various vessel designs. Inca recommends that EPA give the ABYC and Inca at least three years to develop and test these systems, followed by a technical review.

Attwood commented that the combinations of hulls, gunwale, and trailer designs, not to mention engine compartments and tank locations make it a monumental task to understand how each separate component plays into the boats fuel system design. Each item needs to be taken into consideration when designing the system and components to prevent fuel spillage and proper ventilation of the system to provide systems that fill without causing undue fuel spitback.

The chorus of boat builders largely reiterated NMMA's position with respect to refueling controls. They included the following points:

- ABYC has a technical committee established to address the issue of refueling. ABYC should be allowed three years to complete a refueling standard such that the controls could be applied to 2013 model year vessels.
- Refueling control is a complex business. Variables include the refueling pumps, attitude of the vessel, and the vessel fuel system. A vessel's attitude is not under the control of the vessel manufacturer. The levelness of the trailer and the load size and distribution in the boat when it is in the water affects boat attitude. The resulting variation in attitude causes an incalculable number of possible fill angles. Additional factors include single vs. twin engines, two- and four-stroke engines, widely varying vessel sizes, and many option combinations and custom boats. Lowering fuel rates is not a solution because some fuel tanks are very large.
- There are no current requirements for standardized nozzles or automatic shutoff at marinas today. These would need to be in place before ABYC is able to address the technical issues related to refueling and before boat builders can design for compliance.
- Additional labor hours would be required to install the necessary hardware to control refueling and also greatly increase the number of potential fuel leaks at the various additional connections. Any system that depends on automatic shutoff is useless if there are refueling nozzles that do not have automatic shutoff.

OPW and Husky, two prominent manufacturers for fuel nozzles, commented on the detailed specifications for standardizing marine nozzle dimensions. After some interaction regarding the optimal geometries for a standardized nozzle, they agreed that they could meet EPA specifications without changing their current product lineup if we would adopt specifications modeled after those for motor vehicle nozzles. The smaller-diameter nozzle would be capable of handling high flow rates (20 – 25 gallons per minute) that are sometimes seen at marinas. The "marine nozzle" would cost no more than nozzles that are used today.

NMMA responded to the draft regulatory language by commenting that they believed EPA had not provided adequate opportunity to comment on the nozzle requirements, as required by the Administrative Procedures Act. They also noted that many of the marinas are small businesses, so a small business panel may be necessary before implementing these requirements. NMMA nevertheless stated its support for standardizing nozzles and upgrading marina fueling equipment, but preferred to do that in the context of the ABYC effort to adopt refueling standards. In any case, nozzle sizes should be smaller than 1.187 inches in diameter to avoid incompatibility with some vessels that are currently in use. NMMA emphasized that more information from marina owners and marine fuel system designers is needed before taking further action.

Enviro-Fill added that they were working with two boat builders to prove out the technology for preventing refueling losses, and noted that the smaller-diameter nozzle would work well with their technology.

Letters:

Commenter	Document #
NMMA	0688
Sea Ray	0683
Environmental Defense	0648
Attwood	0653
ABYC (hearing)	0642
Enviro-Fill (hearing)	0642
Enviro-Fill	0684
Captain Aaron Kelly	0643
Sea Ray	0683
S2Yachts	0697
Grady-White Boats	0677
North American Sleekcraft	0666
Triton	0656
Lund Boat Co	0655
Brunswick Corporation	0695
Lowe Boats	0660
Godfrey	0645
American Marine Sports	0639
Cigarette Racing	0637
Massachusetts Marine Trade Association	0634
Regulator Marine Inc.	0632
Chaparral/Robalo Boats, Inc.	0630
Ranger Boats	0628
Larson/Glastron Boats	0626
Four Winns Boats	0650
Premier Marine Inc,	0613
Skeeter	0706
Yellowfin	0681
Four Winns	0625
OPW	0804
Husky	0803
NMMA	0805
Enviro-Fill	0806

Our Response:

We appreciate the degree of interest in finding the best approach to reduce spitback and spillage from refueling vessels. This is clearly an issue that everyone understands to be very important. The best approach to ensure that refueling systems are properly designed would involve a standardized test procedure for boat builders to follow with an emission standard in place to determine when a design meets the required level of performance. The process of adopting such a standard would take considerable time, effort, and expense to ensure that the standard and the detailed test specifications are appropriately matched to the range of possible design configurations and their achievable level of control. We do not have the time or resources to include such a plan in this rulemaking but plan to address this issue in the future. We expect to work with ABYC in this effort as they have initiated a process that would help to address this issue.

However, we note from the comments that there is general agreement to adopt requirements now to standardize fuel nozzle geometries, while NMMA noted a preference to define nozzle geometries in the context of ABYC's effort to establish an industry standard practice for boat builders. We believe it is not necessary to wait for development of standards for boat builders before we adopt a requirement applicable to marine refueling nozzles. Because regulating marine nozzle dimensions will reduce HC emissions during refueling, we are adopting the requirements related to marine refueling nozzle under Clean Air Act section 211(C). These requirements will help to reduce air pollution capable of endangering public health or welfare. These nozzle dimensions include the following:

- Nominal outside diameter of 0.824±0.017 inches.
- Straight with no holes or grooves, other than the aspirator hole, for at least 2.5 inches from the terminal end of the spout
- Spring if used, to terminate at least 3.0 inches from the terminal end of the spout
- Aspirator hole 0.670±0.05" from terminal end of the spout

These specifications are identical to those already in place for motor vehicles, with the exception of the minimum diameter and the location of the aspirator hole. However, these dimensions are based on current practice with motor-vehicle nozzles (which includes specifications that go beyond EPA's requirements), so we would expect most or all current gasoline nozzles to simultaneously meet the specifications for both motor vehicles and marine vessels. We may initiate a future rulemaking to merge these two separate specifications into a single specification that would apply universally for gasoline nozzles. We also believe that adopting these specifications now will better assist future efforts to address refueling emissions from vessels by defining a standard nozzle configuration, which we expect to be a necessary prerequisite for designing boats to prevent spitback and spillage. We also believe that adopting these specifications now will better assist future efforts to address the need for adopting provisions in the future to prevent spitback and spillage from marine vessels, as described above.

Note that the nozzle requirements do not include a limitation on flow rate during refueling. If ABYC's analysis indicates that a limited flow rate is necessary as a reasonable boundary condition for designing fuel systems, we would consider including such a specification for maximum flow rate in a future rulemaking. Given the size of many marine fuel tanks, we agree that a restrictive maximum flow rate (below 20 gallons per minute or so) should be avoided if at all possible.

We believe it is most appropriate to adopt the nozzle requirements "upon replacement." Rather than having all marinas replace their nozzles by some date certain, we believe it will be most effective to adopt the requirement now so that any marina replacing a fuel nozzle must use a replacement nozzle that meets the new requirements. This minimizes the cost and disruption of the new requirement and puts the industry on a conversion plan that will generally align with the timing for implementation of future standards. Once this transition has started and there are vessels that benefit from the standardized nozzle geometries, we would expect market forces to accelerate the conversion to the new nozzles. We would consider revising the nozzle regulation to require conversion to the new nozzles by some date certain if it becomes clear that this is necessary to facilitate effective controls resulting from the effort to adopt uniform industry practices for boat designs that minimize refueling losses.

Pending development of any further detailed specifications for designing and testing boats, we believe it is appropriate for us to keep the proposed provision requiring boat builders to follow good engineering practice to allow for a reasonable expectation that operators can expect to fill the fuel tank without spitback or spillage. We would expect boat builders to at least take the minimal steps noted in the proposal to avoid designs that virtually ensure that normal refueling procedures would lead to spillage. For example, running a filler neck to the side of a boat with a substantial horizontal segment at the inlet makes it very difficult to execute a clean refueling event. If an industry standard is adopted, "good engineering practice" would include following the industry standard unless EPA believes such a standard is inadequate.

We believe our proposed rule fairly apprised commenters of the issues related to nozzle requirements. We requested comment on detailed specifications on nozzle dimensions in the proposal. We received a very extensive set of comments during the comment period, some supporting the adoption of nozzle requirements and some objecting. We made draft regulatory language available in the rulemaking docket and sent that draft directly to the parties most affected and most able to further communicate that information to additional affected parties. We also received comment on this later request for feedback. The final requirements are consistent with the discussion in the proposed rule and with the concepts already in place for motor vehicles. In addition, nozzle manufacturers commented that they can meet the new requirements with no change in their current product lineup. As a result, the impact on marinas is a limitation on the nozzle choices they have available. We also understand the nozzle manufacturers' statements to be clearly responsive to Inca's concern that there is a need to evaluate the impact of the new requirement to verify that there will be no safety or performance issues. We would not expect boat builders to change their designs to accommodate the compliant nozzles because such nozzles are in common use today. Based on information from nozzle manufacturers, replacement nozzles will not cost more due to this requirement than they would without it; but there will not be an option to choose from the selection of nozzles that have been available previously. Since there is minimal to no impact on small businesses due to these nozzle requirements, we are certifying that the final rule will not have a significant impact on a substantial number of small entities and EPA has complied with requirements for convening a small business advocacy review panel pursuant to section 609(b) of the Regulatory Flexibility Act.

4.5.2 Refueling– Small SI

What Commenters Said:

OPEI and EMA commented the proposed refueling requirement lacks the necessary defined acceptance criteria necessary to be implemented as a regulatory requirement. As such, OPEI and EMA believe the requirement cannot be included in the regulatory requirements and should be deleted. However, the information provided is valid reference material for future designs and is more appropriately included in the regulatory preamble. If EPA must keep the requirement in this regulation, OPEI commented that EPA should modify the language to ensure there is no conflict with existing applicable ANSI, ISO or EN standards that specify opening sizes.

Environmental Defense noted that gasoline vapors are always present in typical fuel tanks. These vapors automatically are released during refueling as gas inserted into the tank forces out the evaporative vapors from remaining tank space. Fuel spills also occur from Small SI and Marine SI engines during refueling. In the case of marine boats, "relatively large quantities of gasoline are released into the marine environment during marine refueling events." Accordingly, controlling spills during refueling is important for public health and the environment. Environmental Defense noted that EPA is proposing equipment design changes to reduce spills during refueling of both SI small and marine engines and equipment. These design changes provide manufacturers with ample flexibility in choosing designs consistent with good engineering practices to reduce refueling and spillage emissions. Such design changes could include fuel inlets that allow consumers to see rising fuel levels during refueling and automatic shutoff devices. Environmental Defense supported EPA's proposal to reduce refueling spillage and spitback emissions as an important step in protecting human health and the environment.

Letters:

Commenter	Document #
OPEI	0675
Environmental Defense	0648
EMA	0691

Our Response:

EPA and engine and equipment manufacturers have long agreed that refueling emissions are a substantial source of emissions. It has also been clear that it is very difficult to address refueling losses through regulatory requirements since spill-free refueling depends on a combination of several factors related to design of the engine, the design of the equipment, the design of the refueling container, and (not least) the refueling procedures used by millions of owners. Now that exhaust and permeation emissions are on track to reach much lower levels, spillage becomes an ever more important contribution to overall emissions from Small SI engines and equipment.

Our normal approach would be to adopt a test procedure and a corresponding standard so manufacturers would design and produce their products such that they prevent emissions by virtue of their design features, much like we describe above for marine applications. However, Small SI equipment models generally have very simple fuel systems that do not lend themselves to design features for preventing spillage. We recently adopted a requirement for refueling containers (i.e., gas cans) very similar to what we proposed in this rulemaking (72 FR 8428, February 26, 2007)).

We agree with the commenters that the proposed refueling requirements do not include defined criteria for evaluating whether or not the designs are compliant. Nevertheless, we believe it is meaningful and workable to adopt a good-engineering standard for Small SI equipment that corresponds to the provisions that already apply for gas cans. Furthermore, we believe it is reasonable to specify that manufacturers should be able to design their engines and equipment such that operators can reasonably expect to fill a fuel tank without fuel overflow. Many equipment designs today would meet this requirement. For example, riding lawn mowers typically have 2-inch or 3-inch diameter openings for refueling that are located in a place with easy access and good visibility. Smaller equipment with smaller fuel tanks generally have smaller openings for refueling, but we would want to differentiate those designs with a big enough opening to allow for seeing the fuel level and a ready enough access with a refueling spout to avoid spillage in positioning the gas can. Gas cans come with a standard spout diameter of 3/4 inch. This should allow for engine and equipment manufacturers to design their systems to allow for a sufficient margin to prevent an unavoidably awkward procedure to fill the fuel tank. As an example, we would consider a design deficient if it required the operator to use a funnel to properly position the spout from a typical gas can to consistently deliver fuel into the fuel tank.

We agree that any published industry standards addressing equipment designs related to refueling would be sufficient for purposes of implementing the proposed requirement. Specifically, we would not insist that manufacturers go beyond current industry standards to meet our requirements. For example, we are aware of ANSI standards that specify standard dimensions for fuel tanks on chainsaws. We have revised the regulation to take this into account.

Manufacturers also raised a concern in discussions after the proposal that operators may attempt to refuel with a gas can that is too big. For example, filling a string trimmer's fuel tank with a five-gallon container would be awkward and difficult to perform without spilling even if the string trimmer were appropriately designed given the constraint of the size of the fuel tank. We have revised the regulation to specify that the expectation for proper refueling is limited to refueling events with an appropriately sized gas can.

4.5.3 Fittings and connectors

What Commenters Said:

California ARB commented that carburetor and connector emissions could be controlled by available technology.

Letters:

Commenter	Document #
California ARB	0682

Our Response:

We proposed a requirement in §1060.101(f) that manufacturers design fittings and connectors to ensure secure connections that prevent leakage. We did not propose a separate requirement that fittings and connectors be made of low-permeation materials. We believe the emissions resulting from permeation through these parts of the fuel system with very small surface area exposed to fuel will not be great enough to warrant separate testing and certification. As we learn more about low-permeation technologies and gain experience with overseeing evaporative standards for nonroad equipment, we may consider whether it is necessary or appropriate to include such a requirement in a later rulemaking.

4.5.4 Tethered and self-sealing fuel caps

What Commenters Said:

NMMA and Mercury Marine noted that in §1060.101(f), EPA proposed requirements that would apply to equipment manufacturers whether or not they are subject to and certify to any of the evaporative emissions standards in §§ 1060.102 or 1060.105. If these requirements are met, equipment manufacturers will be "deemed to be certified" as conforming with the requirements without having to submit a certification application. NMMA and Mercury Marine supported the first requirement for fuel caps in §1060.101(f)(1)(i), which includes the requirement that fuel caps for equipment subject to diurnal requirements must include a visual or audible indication of when the cap is properly sealed. The added flexibility of being able to use either a visual or audible indication is helpful and recognizes that either approach will be able to signify that the cap is sealing the tank.

Since caps with automatic vents, tethers, and audible or visual indicators of being sealed do not exist, currently, for marine tanks, Mercury Marine requested that this requirement not be implemented before 2010. Mercury Marine commented that design, development, testing and validation to meet these requirements will take 18 to 24 months.

EMA commented that in order to provide necessary alignment with California ARB requirements, the second sentence of §1060.101(f)(1)(i) should be revised to read as follows: "Fuel caps for equipment subject to diurnal requirements must include physical and/or audible feedback to the user indicating when it is properly sealed."

IMPCO and Protectoseal submitted comments on the sealing requirements for gas caps on Large SI engines and equipment. See Section 1.8.2 for those comments and our response.

Letters:

Commenter	Document #
NMMA	0688
Mercury	0693
EMA	0691

Our Response:

The requirement to include tethered fuel caps with sealing indicators does not take effect for Marine SI vessels until there is a diurnal standard. These standards start to apply in 2010 for portable marine fuel tanks and personal watercraft. The diurnal standards start in July 2011 for other vessels (and outboard engines) with installed fuel tanks. Vessels that are exempted from the diurnal emission standards for the first one or two years of the new standards are also exempt from the tethering and sealing requirement. Implementation of these requirements therefore fits with the development timeline suggested by Mercury.

We agree that it would be appropriate to specify a "physical" indication of a sealed fuel cap in addition to visual or audible indicators. We have revised the regulations accordingly.

4.5.5 Keeping water out of evaporative canisters

What Commenters Said:

EMA commented on §1060.101(f)(1)(iii) "What evaporative emission requirements apply under this part?" EMA commented that while this section requires carbon canisters to be installed such that they will not be exposed to water or liquid fuel, it fails to establish the criteria for determining what EPA will consider an acceptable design to preclude exposure to water or liquid fuel. EMA commented that such criteria should either be included in the final rule or addressed in subsequent guidance.

Letters:

Commenter	Document #
EMA	0691

Our Response:

Designing systems to prevent flow of liquids into carbon canisters is achievable with simple and well established technologies. This requirement does not relate to exposing canisters to humid air that may be approaching the dewpoint. A straightforward engineering demonstration would be sufficient to show that water or liquid fuel will not reach the canister. Since this requirement applies to companies that will generally not be submitting an application for certification, this requirement does not involve EPA approval.

4.6 Labeling equipment, vessels, and fuel-system components

4.6.1 Labeling fuel lines, fuel tanks, and other fuel-system components

What Commenters Said:

NMMA and Mercury Marine noted that the evaporative emissions provisions require labeling of the fuel lines, fuel tanks, and other emission-related components in §§ 1060.135 through 1060.138. One of the greatest concerns NMMA and Mercury Marine have with the proposed evaporative emissions labeling requirements is the requirement to include EPA's standardized designation for the emission family. This requirement is contained in §1060.136(a)(3), §1060.137(b)(2), and §1060.138(b)(2). NMMA and Mercury Marine commented that to include the standardized designation for the emission family places a large burden on component and vessel manufacturers. These businesses must already comply with a whole host of labeling/certification requirements. NMMA and Mercury Marine urged EPA to move to a universal label that will simplify the administrative burden placed on the marine industry. They noted that ABYC and NMMA have developed in H-24 and in SAE J1527 uniform language and markings that include all the necessary information and which satisfy the USCG requirements as well as those imposed by California ARB. Both of these standards were recently revised at the request of EPA to reflect low permeation hoses. NMMA and Mercury Marine believe that the uniform language in H-24 and SAE J1527 for fuel lines makes the most sense for this industry. NMMA commented that EPA should also adopt for fuel tank labels the uniform language recommended in ABYC H-24.

NMMA commented that another way for EPA to reduce the regulatory burden associated with the labeling requirements for hoses is to allow for use of hoses certified to other EPA standards. In the past, NMMA has raised with EPA the importance of including in this rule the ability to use hoses that are labeled for purposes of complying with the Recreational Vehicle Rule. This type of flexibility makes sense for manufacturers that produce products for both markets and reduces the compliance burden without impacting emissions reductions.

Sea Ray commented that a universal label would help to minimize the administrative burden for of labeling. Sea Ray encouraged EPA to work with ABYC and NMMA to approve a universal label.

OPEI and EMA commented that the evaporative labeling requirements should be dramatically simplified to respond to both space constraints and common industry practices for identification of manufacturer and construction. Specific requirements to include EPA emission family and FELs are not viable or practical. OPEI noted that California ARB does not require evaporative FELs to be placed on the emission label. EPA's proposal to add individual evaporative FELs on the label would be inconsistent with California ARB, would further confuse consumers, and would be totally impractical for manufacturers. OPEI and EMA commented that EPA should drop completely its proposed evaporative FEL labeling requirement.

OPEI and EMA recommended that the regulatory requirement specify that the evaporative components be labeled such that the Agency, the equipment manufacturer, the engine manufacturer, or any other interested party can logically locate the EPA Certificate of Conformity information. Anything beyond the component manufacturer's designation that can be traced to EPA certification documentation is redundant and should be avoided. For example, fuel tank labeling should include the manufacturer name or trademark and a product identification that allows identification of the applicable Certificate of Conformity. This may include a part number or series number that is identified in the applicable application for certification, and a date of manufacture code.

OPEI commented that handheld engines are integrated equipment and should be allowed to use the California ARB labeling method for harmonization purposes. Fuel tanks and fuel line should be labeled with an ID mark that can be traced back to the emission application for confirmation purposes. OPEI commented that labeling the individual components with statements, FEL, and family names is not always possible.

OPEI commented that language needs to be added to §1060.138 that allows the information required on the fuel cap to be molded in.

EMA commented that the requirements set forth in §90.127(a)(5)(ii) are confusing. EMA noted that the section indicates that the fuel line permeation level must be included on the label in addition to the certificate holder or fuel line manufacturer's corporate name or trademark. However, the example would allow use of SAE classification.

EMA commented that the repeating period of 12 inches on fuel lines is typical in industry and should be maintained. Regardless of the desire to assure the ability to confirm identification there are products that require fuel lines that are extremely short and could not practically include the identification on every piece. EMA commented that if there is a question of compliance, EPA should inspect several units to provide assurance that short lines contain, in aggregate, identification of compliance.

EMA and MIC noted that the proposed regulation incorrectly references §1060.135(e) in several places to identify the provision related to alternate labeling.

Letters:

Commenter	Document #
NMMA	0688
Mercury Marine	0693
Sea Ray	0683
MIC	0701
OPEI	0675
EMA	0691

Our Response:

We agree with the commenters that a streamlined approach for labeling fuel-system components is appropriate. We have developed an alternate protocol with very simple label information that would allow for looking up all the relevant certification information in our database. We believe the label information should do three things: (1) identify that the code relates to emission standards, (2) identify the certifying manufacturer, and (3) identify the certified emission family. This code could be perhaps nine characters in length. For example: "EPA: ABCXYZ" would (1) identify the hose as compliant with EPA regulations, (2) identify the manufacturer as ABC (generally based on the manufacturer abbreviation assigned by EPA), and (3) identify the family as XYZ. Since the manufacturer is identified in the label information, the family identification code can be determined by the manufacturer without the risk that a different manufacturer would use the same code. This shortened labeling protocol applies equally to fuel lines, fuel tanks, and other certified fuel-system components.

This approach should allow manufacturers to label their products consistent with industry standards. The detailed provisions in the final rule may require some additional characters, but it remains very short and allows for the coded approach favored by the industry.

We believe manufacturers should have the option of including the more detailed information on fuel-system components if they would rather not develop the code names for their emission families. For example, we are aware that straight-run fuel lines are commonly labeled with a continuous printing that includes extensive information. Similarly, fuel tanks are already produced with labeling information incorporated into the mold. If manufacturers want to take this approach, we would welcome that.

We agree that harmonized standards and labeling requirements across EPA programs is beneficial. The emission standards and test procedures in this final rule are consistent with those that already apply for recreational vehicles. The labeling regulations for recreational vehicles do not include any specific requirements. We would therefore agree that any fuel tanks or fuel lines that are properly labeled under part 1060 would be suitable for use in recreational vehicles. We intend in the future to broaden the scope of part 1060 to include recreational vehicles, with any appropriate modifications to reflect the unique situation for those applications. We believe this is the best way to maintain a consistent approach across programs.

It is important for equipment manufacturers and EPA inspectors to be able to readily establish the applicable Family Emission Limit for any particular fuel tank. We agree, however, that the FEL can be omitted from the label under the streamlined labeling approach described above, since the label code could be used to look up the family information, including the FEL. This is possible because we require fuel-tank manufacturers to recertify a fuel tank if they change the FEL. Changing the FEL without recertifying the emission family would lead to confusion, since the database would not readily associate a single FEL with each family code. For manufacturers choosing to include the more detailed label information on their fuel tank, we are specifying that the FEL should be part of the included information. Without the code for looking up certification data, equipment manufacturers and EPA inspectors would otherwise not be prompted to know that an FEL applies for any particular fuel tank.

We are including the proposed requirement to label fuel lines with continuous information, repeating at least every 12 inches (except for short segments), with one modification. The shortened labeling approach we are allowing for the final rule does not lend itself as well to continuous repeating. We are therefore revising the regulation to specify that this code must be repeated such that the blank space between repeated label information must be no longer than the code itself. We understand that this approach to labeling for short fuel-line segments may involve individual pieces that do not include a complete set of labeling information. We agree with the commenter that inspection of multiple fuel lines associated with an engine would be an appropriate way of evaluating these products.

We agree that fuel caps and other components besides the fuel tank may be properly labeled by molding the label content with the part. We have revised the regulation to specifically allow this.

We have corrected the references to the alternate labeling provisions in §1060.135.

4.6.2 Labeling equipment and vessels

What Commenters Said:

OPEI commented that to create a practical, efficient program and provide greater harmonization with California ARB, EPA should finalize –as an alternative compliance path – an integrated and holistic evaporative compliance approval process. This process should explicitly provide for a single evaporative and exhaust certification application, an integrated label, and an inclusive warranty statement consistent with California ARB's approach. For example, for engines or equipment using a single label for both exhaust and evaporative compliance, the emission compliance label language should be combined to read "This engine complies with U.S. EPA EXH/EVP STDS." The engine or equipment manufacturer that is responsible for the introduction into commerce of the complete evaporative control system required by this part should label the engine/equipment. The label should simply include the following information: 1) Corporate name or trademark; 2) Date of manufacture [month and year] unless it is stamped or engraved elsewhere on the engine/equipment; and 3) Statement of compliance; i.e., "this equipment complies with U.S. EPA evap. Stds."

OPEI commented that the requirement to add a statement about using credits to certify (see §1060.135(b)(2)(iv)) is not used for exhaust certification labels today. Such a requirement is not justified, serves no purpose to consumers and is an unnecessary burden and therefore should be deleted. When EPA inspectors need this info, they can get it from their own certification website.

EMA commented regarding §1060.135(b)(2) that whether a product generates or uses credits should not be included in labeling. EMA noted that ABT information is available in the certification application documents. Including this information on the label serves no purpose, and would take up unnecessary space on a very small and crowded label.

EMA commented that the proposed labeling requirements in §1060.135(b)(1) are not feasible. The engine or equipment manufacturer that is responsible for introducing into commerce the complete evaporative control system required by this part should be required to provide the emission compliance label for the engine/equipment. The emission compliance label should only be required to include the following information:

(i) Corporate name or trademark

(ii) Date of manufacture [month and year] unless it is stamped or engraved elsewhere on the engine/equipment

(iii) Statement of compliance; i.e., "This equipment complies with U.S. EPA evap. stds." For engines or equipment using a single label for both exhaust and evaporative compliance, the statement of compliance would read "This engine complies with U.S. EPA EXH/EVP STDS."

Briggs and Stratton commented that the labeling requirements for engines and components needs to be simplified and harmonized significantly from what is in the proposal. A lot of unnecessary and impractical requirements are proposed which add no benefit but a lot of cost and effort for manufacturers.

Honda commented that in the case where a single manufacturer is certifying and building the complete assembly, there should be no requirement to label components as specified in §§1060.136 through 1060.138. Honda requested that if an engine manufacturer chooses to certify a complete fuel system, that a single emission label for exhaust and evaporative standards compliance be allowed. Purchasing fuel tanks that are designed, manufactured and certified by a third party is not the only way an equipment manufacturer or engine manufacturer builds a product. In fact, it is uncommon, other than for portable and some larger marine fuel tanks, that a manufacturer will use a generic or third party fuel tank. It is much more common for the equipment or engine manufacturer to outsource the manufacture of the fuel tank based on its own tooling and design. This is also true for fuel lines, especially molded fuel lines that are required for the confined spaces and challenging routing for many engines and equipment. Honda suggested that the final rule should recognize that there can be one certifying entity for a complete fuel system or that the system can be assembled as a combination of certified parts by any combination of certifying entities.

Honda commented on §1060.135(b) with regard to OB/PWC labeling. Honda recommended that a simplified statement be used on the single label stating only that the outboard engine or the PWC complies with the evaporative requirement. Since there is already a compliance statement this could be accomplished by adding the word evaporative or better the abbreviation “evap”. Actually, an even simpler statement is possible. Because the regulation requires both exhaust and evaporative compliance the label could simply state compliance with the requirements for the applicable model year i.e., THIS ENGINE COMPLIES WITH U.S. EPA REGULATION FOR (MY) SPARK IGNITION MARINE ENGINES.

Boat builders belonging to NMMA commented on the labeling requirements. They commented that the proposed labeling regulations are vague and confusing. They commented that EPA needs to simplify the requirements and should work with NMMA and ABYC to create universal compliance label and location, such as on the hull. The boat builders noted that ABYC and NMMA are working on developing a universal label that will include all information and would like to work with EPA.

NMMA included later comments to suggest label language that states: "This boat complies with EPA evaporative emission requirements in place at the time of construction". This label would be located on the helm and would follow the USCG required language that states that the vessel is in compliance with their regulations. They included pictures showing labels required by Coast Guard. In addition, NMMA requires that their members add a certification plate at the vessel’s helm. NMMA recommended that we allow boat builders to combine these various labels and suggested that we require all such labels to be visible from the helm of the vessel.

Letters:

Commenter	Document #
Yellowfin	0681
Honda	0705
OPEI	0675
Briggs and Stratton	0657
EMA	0691
Sea Ray	0683
S2Yachts	0697
Grady-White Boats	0677
North American Sleekcraft	0666
Triton	0656
Brunswick Corporation	0695
Lowe Boats	0660
Godfrey	0645
American Marine Sports	0639
Cigarette Racing	0637
Regal Marine Industry	0635
Massachusetts Marine Trade Association	0634
Regulator Marine Inc.	0632
Ranger Boats	0628
Larson/Glastron Boats	0626
Four Winns Boats	0650
Hallett	0713
Skeeter	0706
NMMA	0790

Our Response:

We agree with the commenters that the evaporative labeling requirements for equipment should be simplified and better aligned with the requirements adopted by California ARB. For equipment that is produced using only certified components (i.e., certified by companies other than the equipment manufacturer), the final rule specifies that the label include only the manufacturer's name and a simple statement that the equipment uses certified components. For certifying equipment manufacturers, we also require the date of manufacture to be on the label (or permanently identified elsewhere on the equipment), and coded information to identify the various certified components. This may take the form of a single code that allows us to look up all the part information in the manufacturer's application for certification, or manufacturers may identify the individual components. For manufacturers that certify with respect to both exhaust and evaporative emissions, this code could be the engine family name used for compliance with exhaust standards. We would expect many equipment models to use only two certified components (fuel tank and fuel line), though other models might have include multiple fuel tanks or fuel lines from different emission families. Being able to access information related to certified components will be very helpful for inspectors to establish whether an individual piece of equipment complies with the regulations.

This approach includes specifications that are nearly identical to those adopted by California ARB. Where we specify additional detail, we believe there will be a minimal burden to make the label more prescriptive or more informative than California ARB requires. We would also expect California ARB to consider revising its requirements to complete the effort to harmonize federal and state requirements.

We agree the manufacturers do not need to separately identify equipment that generates or uses emission credits. Identifying the certified components and the emission family name for the equipment (if applicable) should allow EPA or Customs inspectors to identify whether the equipment complies with regulations or not.

We also agree that manufacturers certifying with respect to both exhaust and evaporative emissions should be able to combine information into a single label. In fact, this would be preferred for EPA's purposes, since all the relevant information would be presented together.

We have included in the final regulation NMMA's suggestion to require vessel labels to be visible from the helm. This labeling content may also be combined with other required labeling information, such as labels required by Coast Guard.

4.7 Certification and compliance issues

4.7.1 Useful Life

What Commenters Said:

OPEI and EMA commented that the proposed lead time is not sufficient to allow confirmation of the EPA proposed useful life period of five years. OPEI and EMA suggested a two-year useful life requirement for all evaporative standards. If necessary, they noted that a longer durability period should be the subject of a subsequent rulemaking. OPEI similarly commented that EPA should restrict the useful life requirements for handheld fuel lines in the first three years of the standard to two years instead of five, because there will be no opportunity to verify longer useful life of the uniquely handheld equipment solutions before the first low-permeation fuel lines go into production.

EMA commented that the default maximum calendar time for required compliance of 5 years for exhaust and 2 years for evaporative must be included in the definition of useful life in §1054.801. Accordingly, EMA suggested the useful life definition should be revised as follows: "…degree of service accumulation can be verified separately or the engine/equipment have exceeded the required compliance calendar period."

EMA noted that useful life for evaporative controls is addressed in §1060.101(g) and §1054.145. EMA commented that EPA should combine all useful life discussion into one section.

Promens commented that under §1045.145(d) and §1054.145(g) an interim provision is being offered for a limited time of two years for Marine SI and Small SI fuel tanks through 2013 to allow manufacturers to gain experience. This provision is greeted with open arms but does not give the fuel tank manufacturers enough in-field use experience as might be expected. Promens noted that a typical marine fuel tank may be manufactured in March, is shipped and stored at the boat manufacturer for up to 3 months then installed into the vessel. The vessel is stored as a finished product at the boat manufacturer for 1 to 2 months, is shipped to a dealership and then sits in storage for as long as 6 months until it is sold at the retail level. A typical scenario may place the tank from date of manufacture to end user in 4 to 11 months. This lowers the in-field experience level down to only a little over one year. Promens noted that many boat owners use their boats only on weekends and only for 3 to 5 months of the year. Therefore, true in field use could be reduced to as little as a 3 to 6 month timeframe in the two years provided by this provision. Promens requested that this provision be extended to three years to provide a true measure of at least two working seasons.

Letters:

Commenter	Document #
EMA	0691
OPEI	0675
Promens (Hearing)	0642

Our Response:

Emission standards are meaningful only to the extent they ensure emission reductions over the period that equipment is properly maintained and used. We believe there are emission control technologies already available to achieve most of the new emission standards and there has been time to establish the necessary durability of the products. In some cases, manufacturers are working toward commercializing technologies that have been under development more recently. In these cases too, we would expect manufacturers to factor durability into the design effort to ensure that products will meet emission standards over five years of normal use. Manufacturers provided no basis for claiming that it was possible to comply over a useful life period of two years but not five years. However, to ensure that manufacturers have some opportunity to take steps to confirm the durability of permeation controls for fuel tanks and cold-weather fuel lines, we are adopting a two-year useful life for model years before 2014. We also note that the permeation standards were first proposed in 2001 for Marine SI vessels and in 2007 for Small SI equipment. These several years of lead time should allow manufacturers ample opportunity to confirm that technologies are durable, including any need to adjust product specifications or production processes to comply.

It is not necessary to include the additional text to the definition of useful life, as recommended by EMA. The definition already references the appropriate cites to illustrate which useful life periods apply.

We intend for §1060.101 to include a general framework for establishing useful life. The interim provisions for a shorter useful life in §1054.145 are limited to Small SI engines and equipment and will have no relevance after 2013. We therefore believe it is unnecessary to add that as clutter to the long-term provisions in §1060.101.

4.7.2 Division of responsibilities for component manufacturers, engine manufacturers, and equipment/vessel manufacturers

What Commenters Said:

EMA noted that the NPRM properly recognized that evaporative emission control of Small SI engines and the equipment these engines power may involve the engine manufacturer, the equipment manufacturer, or the component supplier. Accordingly, EMA supports the overall framework of the NPRM, and urged EPA to finalize a rule that preserves that framework in order to maintain the feasibility of the pending rulemaking.

EMA commented that the complex multi-level, disaggregated nature of the industry's structure makes it impossible to impose the evaporative emission control requirements on either the engine manufacturer or the equipment manufacturer exclusively. For example, EMA noted that the highest volume engine/product category affected by the NPRM is walk-behind lawnmowers. In the case of such lawnmowers, the engine manufacturer generally provides the equipment manufacturer with a complete, compliant product that complies with all regulatory requirements (including both exhaust and evaporative emission controls). In such a scenario, all regulatory compliance, emission warranty, and other requirements typically are the sole responsibility of the engine manufacturer. In addition, California requires such engines to comply with performance-based standards that require testing using a SHED. In contrast, EMA noted that the lowest volume products covered by the NPRM are produced by equipment manufacturers that utilize "standard" engines purchased through a distribution network. In those cases, the engine manufacturer typically has no direct relationship with the equipment manufacturer. Due to the structure of the industry, EMA commented that the flexibility proposed in the NPRM is absolutely necessary in order to allow alternate means for the production of compliant engines and equipment. Accordingly, it is crucial that such flexibility be maintained in the final rule.

EMA commented that it is not appropriate or practical for equipment manufacturers that are using engines certified to the exhaust standard provisions by their engine supplier to include information regarding exhaust standard compliance. Engines certified for use with equipment manufacturer supplied fuel tanks will include the required interface features to allow the equipment manufacturer to install engines into equipment with the running loss controls in place without modification to the engine. EMA commented that equipment manufacturer modifications to engines certified by the engine manufacturer should be considered tampering, unless the modification is contractually agreed to by the engine and equipment manufacturer.

Honda recommended that EPA implement the necessary steps to accept SHED-tested engines and equipment as an option to component certification throughout the Phase 3 regulation. Engines and equipment that have evaporative emission certification granted by California ARB, based on SHED testing and meeting the running loss control requirements, will exceed the EPA emission reduction standards. For this reason, Honda commented that these engines and equipment should be granted an EPA certificate based on the test data upon which the California ARB certification is based. Honda appreciates that EPA has provided the option to use the California ARB certification, regardless of the actual parts used to comply with the

SHED standard, to demonstrate compliance with the early fuel line requirement and the transition period implementation of additional controls. Similarly, Honda noted that EPA acceptance of this testing option will allow them to sell their products in all 50 states. This harmonization is beneficial to the environment and economy of all parties involved, from suppliers in the production cycle to the final user of the product, and would be applicable both near term during the regulatory transition phase and beyond 2013.

The RV Industry Association noted that with respect to towable RVs, there are more than 50 manufacturers producing many hundred different RV models and floor plans. Total industry-wide production of towable RVs in 2006 exceeded 334,600 units. Given the proposal's requirement that certifications be filed for each applicable model, along with the staggering number of potentially affected models produced by RV manufacturers, they believe that the proposed certification requirements will inundate the agency with thousands of certification submissions annually from the RV industry alone. The RV Industry Association commented that this reality suggests changes to the proposed certification requirements need to be considered. If the end goal is to develop a regulation that provides for enhanced control over evaporative emissions from generator fuel systems without unnecessarily burdening government and industry, EPA should consider emulating the approach adopted by California ARB in 2005 for its Small Off Road Engine (SORE) regulation. Under that regulation, if a RV manufacturer utilizes only fuel system components specified by the manufacturer of the generator (who has itself obtained an Executive Order from California ARB), then there is no up-front certification burden on the RV manufacturer. Conversely, if any RV manufacturer elects not to use the components specified by the generator manufacturer, it then becomes the responsibility of that RV manufacturer to certify to California ARB that the generator fuel system complies with the applicable requirements.

Briggs and Stratton commented that when an equipment manufacturer certifies for evaporative emissions it is not clear if the certified components used (fuel tank, fuel cap (if separate), fuel line, and carbon canister) are combined into an application. Briggs and Stratton commented that this issue needs to be clarified so that one manufacturer (the engine or equipment manufacturer as applicable) gets a combined certificate for the product. It appears that the way the NPRM is written each component manufacturer is responsible for labeling, warranty, etc. for each component. Briggs and Stratton commented that this is not a practical way to manage the emissions certification process.

EMA commented that the proposal does not appear to allow a manufacturer responsible for both the exhaust and evaporative emission requirements to submit a single certification application and obtain a single Certificate of Conformity for compliance with both requirements. Engine manufacturers that produce fully integrated engines, such as walk behind mower engines and many handheld products, should be provided the opportunity to submit one application and obtain a single Certificate for their products. In addition, §1054.201(a) states that a manufacturer certifying to both exhaust and evaporative emission requirements must submit separate applications. If finalized, EMA believes this requirement would preclude a manufacturer from combining documentation, labeling, and other features that could result in a significant reduction in paperwork and lower potential for errors. EMA commented that manufacturers should be given the opportunity to combine exhaust and evaporative certification submissions and obtain a single Certificate of Conformity at their discretion.

EMA commented that §1054.205(o)(2) is inconsistent with the requirement to segregate exhaust and evaporative certification submissions as proposed under §1054.201(a). EMA believes manufacturers should be allowed to submit a combined exhaust and evaporative application. EMA commented that if their recommended revisions to §1054.201(a) were implemented, then §1054.205(o)(2) is acceptable. However, if their recommended revisions are not implemented, EMA commented that §1054.205(o)(2) must be deleted.

EMA noted that the first sentence of **§**1054.2 refers to manufacturers of engine and fuel-system components as described in §1054.1. However, §1054.1 does not describe engine and fuel system component manufacturers. The last sentence of this section states that equipment manufacturers are generally responsible for evaporative emissions. However, the evaporative emission control requirements described in Part 1054 are generally applicable to engine manufacturers (equipment manufacturer requirements are identified in Part 1060). EMA commented that this section must be revised so that it accurately identifies the industry to which the regulatory sections (1054 or 1060) apply.

EMA commented that the proposed language in §1060.5(e)(2) is confusing and must be clarified. EMA recommended that the first sentence be revised to read as follows: “Engine and equipment manufacturers that produce handheld Small SI engines/equipment must certify their engines and fuel systems under 40 CFR Part 1054. However, they must certify...”

EMA noted that as proposed, §1060.5(e)(1) would require the component manufacturer to certify fuel lines and fuel tanks, except as allowed by §1060.601. However, §1060.601(f) does not require the component manufacturer to certify fuel lines and tanks, but rather gives them the option to do so. EMA commented that this section should be revised to identify this option and specifically refer to §1060.601(f).

Honda suggested that the final regulation state clearly what parts of §1060.5(b)(3) apply to outboard marine engines and avoid implications of requirements associated with completely different products (e.g., vessels). Specifically, Honda noted that §1060.5(b)(3) states that “manufacturers of outboard engines must meet all the requirements that apply to vessels”. Honda believes this is lacking important specificity, overly broad and can lead to misinterpretation. Honda commented that the outboard engine manufacturer should be responsible for the permeation emission from the fuel lines integral to the engine (under the cowl) and permeation emissions from the fuel tank for the very small outboard engines that include the tank as part of the engine. All other parts of the fuel system are either part of the boat or, as in the case of a portable marine tank, are certified, manufactured and sold by a third party and not part of the outboard engine manufacturer production, certification or responsibility.

Brunswick commented that boat builders already have an overwhelming number of certification and labeling requirements for the boat itself and that most companies don't have staff for certifying. We need to ensure that we work towards a universal solution regarding these matters to avoid confusion. Brunswick noted that NMMA has a current "type accepted" program for many safety related components that are installed in boats. A similar approach to the certification requirement would make it a much easier transition for boat manufacturers to follow.

A chorus of boat builders that are NMMA members submitted comments on certification. They noted that companies do not have experience or staff in certifying with EPA. They commented that there will be a need for EPA to provide training for boat builders on certification and penalties. They noted that NMMA has a “type accepted” program, which the industry is familiar with, and commented that such a program would make for a smoother transition for the industry to certification with EPA?

Letters:

Commenter	Document #
Sea Ray	0683
Honda	705
RV Industry Association	0647
Briggs and Stratton	0657
Brunswick (hearing)	0642
EMA	0691
Triton	0656
Lund Boat Co	0655
Brunswick Corporation	0695
Brunswick Commercial and Government Products, Inc.	0652
Lowe Boats	0660
Godfrey	0645
Cigarette Racing	0637
Regal Marine Industry	0635
Massachusetts Marine Trade Association	0634
Regulator Marine Inc	0632
Chaparral/Robalo Boats	0630
Ranger Boats	0628
Larson/Glastron Boats	0626
Four Winns Boats, Inc	0650
Skeeter	0706

Our Response:

We agree that the rule should balance the respective roles of engine, equipment, and component suppliers. We have preserved the proposed framework for assigning certification responsibilities, with various adjustments and clarifications as noted below.

Engine manufacturers must supply equipment manufacturers emission-related installation instructions. We expect these instructions to include any necessary requirements, restrictions, or other information to ensure that the finished products are compliant with exhaust and evaporative emission standards. Equipment manufacturers that do not follow these installation instructions are in violation of the prohibitions in §1068.101.

We agree that the regulations should allow Small SI manufacturers to use the SHED-based measurement procedures from California ARB without expiration, as described in Section 4.7.2.

We believe we have constructed a certification protocol that minimizes the regulatory burden on EPA and industry. By focusing on component certification, we are aiming to place certification responsibilities as far upstream in the assembly sequence as possible. This prevents multiple equipment manufacturers using a common fuel tank or fuel line from needing to submit paperwork to EPA. The regulations allow for equipment manufacturers to assume certification responsibilities for components, but this is only where this arrangement is agreeable to both component and equipment manufacturers. Control of running losses for nonhandheld engines pose a challenge to this approach. Only the manufacturers assembling the complete fuel system for engines and equipment can certify with respect to running losses. We are aware that this will require the involvement of a large number of companies. However, running loss certification is relatively simple, since most companies will use one or at most two approaches. The running loss requirement does not involve emission measurement so the application for certification will consist of little more than a brief description of the method of control. We believe this approach is consistent with the requirements adopted by California ARB.

We expect to prepare certification documents such that manufacturers can include information related to exhaust and evaporative emissions compliance in a single submission. We may issue combined or separate certificates for exhaust and evaporative emission controls, but we intend to make efforts to simplify data submission as much as possible. We have revised §1054.201(a) to specify that separate certifications are required for each <u>engine</u> family; this emphasizes that separate certificates apply for families with respect to exhaust emissions without limiting our approach for certifying with respect to evaporative emissions. Component manufacturers that certify their products are obligated to meet all the requirements associated with certification. However, in the case of Small SI equipment, we also require equipment manufacturers to certify their equipment. This would allow for an approach to warranty that aligns with existing practices. If the equipment manufacturer provides the warranty for components, the certifying component manufacturer would have no further obligation to meet warranty requirements. In cases where equipment manufacturers don't certify (most commonly with marine vessels), the component manufacturers should make contractual arrangements to delegate responsibilities for processing warranty claims.

We have revised the regulation to move the certification requirements for evaporative emissions to part 1060. We have therefore removed the proposed requirement from §1060.205(o)(2) to submit evaporative emission data in the application related to compliance with exhaust emission standards. Engine and equipment manufacturers that certify with respect to evaporative emissions must certify under part 1060. The remaining evaporative-related regulations in part 1054 summarize the applicable standards, describe the provisions related to emission credits, and present various interim provisions that are specific to Small SI engines and equipment. Certifying for compliance with exhaust and evaporative emission standards in separate parts does not prevent us from combining these applications for certification, as described above.

We have revised §1054.2 to clarify who is responsible for meeting evaporative requirements under part 1054. We have eliminated the reference to component manufacturers, since they would be certifying under part 1060 and they have no responsibility for producing or installing engines that meet exhaust emission standards. Also, engine manufacturers are responsible for meeting evaporative emission requirements only to the extent they install fuel-system components. However, engine manufacturers that install complete fuel systems are considered to be the equipment manufacturer with respect to evaporative emission standards.

We drafted §1060.5(e)(2) to address three separate scenarios for assigning certification responsibilities to different types of manufacturers. EMA's suggested wording is not inconsistent with the proposed language, but it does not allow for a clear presentation of the full range of scenarios. We are finalizing these provisions as proposed.

We have revised §1060.5(e)(1) to refer specifically to §1060.601(f).

We agree that the proposal included overly broad assignment of responsibility to outboard engine manufacturers. We have revised §1060.5(b)(3) to specify that engine manufacturers must comply with requirements that apply to vessel manufacturers <u>for those fuel-system components they install on their engines</u>. This is true for all types of marine engines, so we no longer apply this provision only for outboard engine manufacturers.

We are adopting an approach that minimizes the compliance for boat builders. Boat builders that do not build their own fuel tanks will generally be able to buy certified components that meet all applicable emission standards (permeation and diurnal). Boat builders must keep records to document their compliance and apply a simple label to their vessels. We believe this approach is very similar to the type approval described by NMMA. We look forward to working with NMMA to ensure that boat builders and component suppliers are informed of the new requirements and have access to the tools they need to comply.

4.7.3 Relationship to California ARB certification (reciprocity, etc.)

What Commenters Said:

OPEI noted that as proposed, there are still several conflicts that will prevent 50 state products with common certification applications, and common testing, labeling, and warranty standards for the same evaporative families. California ARB's evaporative program allows the certifying engine or equipment manufacturers to: 1) Install all the evaporative components; 2) Apply an integrated engine exhaust and/or evaporative label; and 3) Issue to consumers a single, integrated emission warranty statement – for the complete evaporative system (i.e., tanks and fuel lines) – even when a separate component supplier performs the actual tests to demonstrate compliance. To further facilitate an efficient certification process, California ARB allows manufacturers with the needed flexibility to broadly aggregate families based simply on the use of different materials and technologies.

OPEI noted that in sharp contrast, under the Phase 3 proposal, EPA would have to issue separate and distinct certifications (in all cases) that would require unique labels for each individual evaporative component. Unlike California ARB, EPA's proposal apparently would not practically allow a single integrated exhaust and/or evaporative label or combined warranty statement from the engine manufacturer or the OEM. OPEI believes that EPA's proposal creates unintended problems and is impractical – given the small spaces for labels on most products. EPA's proposed piecemeal approach would be confusing to consumers, who would have to read numerous confusing labels and try to track and apply numerous warranty statements. Moreover under EPA's overly-complicated, piecemeal evaporative program, even manufacturers of integrated products could not certify and label a 50-state product – even though it fully meets the EPA and California ARB programs. In this regard, EPA's proposal imposes substantial administrative burdens without any benefits.

OPEI noted that during the interim or transition period (generally before 2011), EPA proposed to fully accept California ARB evaporative Executive Orders for evaporative systems and components without requiring extensive re-testing and re-certification. OPEI urged EPA to permanently accept California ARB Executive Orders as a demonstration of compliance to allow manufacturers to avoid wasting substantial resources (re-testing and re-certifying) California ARB Tier III-compliant products with no commensurate environmental benefits. For example, under the California ARB Tier III program, the complete connected fuel tank and engines on walk-behind mowers (and other products certified using the California ARB SHED-performance requirements) must be certified under a very stringent SHED-based performance standard that is more robust that EPA's component-based certification program. While OPEI fully supported EPA's assessment that SHED-based testing requirements are not viable or cost-effective for all Small SI products, OPEI commented that it does not make any sense to require these California ARB-compliant lawnmowers and other products to be re-certified on a component-by-component basis. OPEI requested that manufacturers have the option to certify products to EPA's Phase 3 requirements based on previously established performance certification to California ARB's Tier 3 limits.

EMA commented that EPA should accept engines and equipment that are certified to California ARB Tier III standards via compliance with a full diurnal SHED test in addition to running loss control requirements. Even though the manufacturer will not have documented individual component emission performance for such engines or equipment, EPA should accept such engines because they exceed EPA's required emission reduction expectations. Certain products, such as walk-behind lawn mowers certified for California ARB utilizing the SHED-based performance option will not have individual component emission performance documented by the manufacturer; however, such products exceed EPA's required emission reduction expectations. EPA's acceptance of this testing option will provide a significant environmental benefit as well as the much sought after harmonization necessary to enable manufacturers to distribute product on a 50-state basis.

California ARB commented that EPA should specifically consider adopting language giving flexibility to accept the California ARB diurnal test results that measure the same or more restrictive performance standards as satisfying the EPA requirements for tanks and hose assemblies. As part of its evaluation, California ARB is testing the entire tank as one unit, and the hose and primer bulb as an assembly. In this way, the permeation aspect is included in the test results. California ARB diurnal test procedures for tanks include permeation as well as evaporative emissions from fittings, pickup tubes, and fill caps. Likewise, the hose and primer bulb test method includes all fitting and hose connectors.

OPEI specifically requested that EPA make additional efforts to harmonize all its evaporative test methods with the California ARB Tier 3 requirements. Harmonizing soak temperatures, tolerances, measurement methods, and reporting requirements will substantially reduce regulatory burdens without reducing environmental benefits. OPEI commented that all components that have achieved California ARB compliance and received a California ARB Executive Order should be approved for use on EPA compliant products without additional testing, labeling, or burden on either the engine manufacturer, equipment manufacturer, or fuel line manufacturer.

OPEI also requested that products meeting the California ARB Tier 3 diurnal and running loss requirements automatically be deemed compliant with EPA's Phase 3 running loss regulations.

EMA commented on §1060.105(e)(2) that manufacturers should have the option to comply with the design standard requirements by certification with the diurnal requirements specified for Small SI engines by California ARB. EMA recommended that an option (v) be added that reads as follows: "Have a valid Executive Order from California ARB that includes running loss control."

EMA commented that a California ARB approved fuel line always should be acceptable, not just during the transition period. California ARB compliant fuel lines that have received a California ARB Executive Order should be approved for use on EPA compliant products without additional testing, labeling, or imposition of any other burden on either the engine manufacturer, equipment manufacturer, or fuel line manufacturer.

In general, California ARB recommended that EPA either modify its proposal to match the California program or allow California test results to meet the EPA requirements.

NMMA and Mercury Marine noted that EPA's proposal contains an entirely new Part 1060 which would establish evaporative emissions requirements for all Marine SI engines. They also noted that California ARB also is in the process of developing evaporative emissions rules for Marine SI engines. Two separate requirements for evaporative emissions create needless complexity and impose an additional burden on industry. NMMA and Mercury Marine as well as several NMMA member boat builders strongly urged EPA to develop a national evaporative emissions rule to simplify the regulatory requirements applicable to marine engine and component manufacturers and boat builders.

Sea Ray also recommended a "national approach" to establish evaporative emissions requirements for Marine SI engines. Sea Ray encouraged EPA and California ARB to work as partners and develop a national evaporative emissions rule to simplify the regulatory requirements and eliminate the regulatory burden of complying with two separate sets of regulatory requirements. Sea Ray commented further that they encourage EPA to look for common alignment with the current California ARB rule considerable amount of effort has been made to meet those guidelines. They also encourage EPA to work closely with industry on the key aspects of this rule.

Letters:

Commenter	Document #
Sea Ray	0683
OPEI	0675
Mercury	0693
California ARB	0682
EMA	0691
Grady-White Boats	0677
Triton	0656
Brunswick Corporation	0695
Brunswick Commercial and Government Products	0652
Lowe Boats	0660

Our Response:

Our proposed requirements were substantially aligned with the requirements adopted by California ARB. We have made several changes in the regulations to eliminate many of the remaining areas where there were inconsistent requirements or specifications between the two programs.

Perhaps the broadest area of concern relates to whether equipment manufacturers or component manufacturers would need to certify their products. We believe it is the most efficient and practical approach to put primary certification responsibilities on component manufacturers. They have the primary responsibility to design and produce compliant products. They are generally also best positioned to generate emission data and submit applications describing how the products meet emission standards. The alternative approach of requiring equipment manufacturers to take primary responsibility for certification would greatly increase the number of certifying manufacturers and involve a tremendous duplication of effort as dozens or perhaps hundreds of equipment manufacturers would certify products from the same component manufacturer.

At the same time, we are aware that there may be legitimate business reasons for equipment manufacturers to prefer to take on the certification responsibility instead of component manufacturers. Where component manufacturers have a written commitment from the equipment manufacturer stating that the equipment manufacturer will certify the product, the component manufacturer may delegate all compliance responsibilities to the equipment manufacturer. In the case of Small SI equipment, we additionally require equipment manufacturers to certify their equipment, largely as a result of the running loss emission standards.

This sets up a different default than that established by California ARB, but it nevertheless allows for a harmonized approach. Manufacturers using any combination of component and equipment certification in California can rely on those certifications with EPA, as long as the documentation makes it clear who is responsible for certifying each item.

We are adopting California ARB's SHED-based procedures on a permanent basis. This decision depends substantially on California ARB making a change to their certification fuel to include the effects of ethanol on permeation rates. If this does not change, we intend to revisit this provision to limit its applicability or to allow it only for testing with EPA's certification fuel.

We have revised the regulation in several areas to align with the testing and certification provisions adopted by California ARB. One area that remains different is the test fuel. As described in Section 4.8, we have determined that it is important to maintain the proposed specification including ethanol in the test fuel. California ARB has communicated that they plan to revise their specified test fuel, so it is not possible at this point to identify a test fuel that will align with California ARB for the long term. The current regulation therefore does not allow for components certified using California test fuels to be valid for demonstrating compliance with EPA standards.

We proposed to include a provision allowing manufacturers to use their California ARB certification as the basis for meeting EPA's running loss standards. This provision will remain in the final rule.

We will continue to communicate with California ARB in their effort to set evaporative standards for Marine SI applications.

4.7.4 Production period for component certification

What Commenters Said:

EMA and OPEI commented that EPA should not require annual re-certification of fuel lines. EPA has sufficient enforcement power to ensure that on-going production remains in compliance without an annual certification process. In addition, EPA must provide sufficient notice, either directly or through the fuel line manufacturer, to customers if a previously certified product will no longer be available as a result of EPA's determination that the Certificate of Conformity is no longer valid.

EMA commented that once EPA has issued a Certificate of Conformity for a component, the Certificate should remain valid until there has been a change in the applicable standard level or it has been voided. Component certifications should not require either annual or periodic renewal. In the event a component manufacturer certificate is voided as the result of a compliance enforcement action, EMA commented that all users of the affected components must be provided a minimum of one full model year after notification to identify alternative compliant components.

Saint Gobain noted that EPA is proposing under §1060.201 that fuel system components such as a fuel line hose or tubing must be certified on an annual basis. For components such as fuel line hose or tubing as part of the low emission fuel-system equipment, they fail to understand the need to recertify this component on an annual basis. Usually when such a product is developed, perfected and sold into the industry, the design could have a significant life span before it would be modified or discontinued. A typical life span could be 5-10 years. So it would seem to be a very redundant and unnecessary requirement to certify this type of component for each year of production. In fact such products are never distinguished by model years.

Saint Gobain noted that many of these types products are sold through a network of distributors and dealers, thus it could create severe inventory problems. They raised a number of questions in their comments. For example would tubing manufactured in 2009 be required to be installed on equipment prior to December 31, 2009? Would they be required to brand or label the tubing with a model year? If such were the case, then many customers would be forced to scrap out any unused tubing or they would want to return it to the manufacturer. This could create unnecessary financial hardships. They also asked about the aftermarket application such as replacement tubing/hose for marine outboard engines and lawn mowers. Would dealers and retailers be required to throw out this unused inventory after December 31st? This would basically require an expiration date on such products.

Saint Gobain suggested that EPA exempt fuel line tubing and hose from the annual certification requirement. They observed that annual certification might make sense if the fuel line is part of fuel system assemblies built for specific model year equipment. In such cases the hose or tubing manufacturer may be subject to annual certification. This would be an example of an OEM application where the inventory is carefully controlled. A fuel hose or tubing within a family of design should only be required to be certified once for its lifetime of production.

Letters:

Commenter	Document #
OPEI	0675
Saint Gobain	0661
EMA	0691

Our Response:

We agree that fuel components are not generally produced based on annual production periods. Thus, neither the proposed regulations nor the regulations being finalized require annual certification for components. However, the regulations do not allow component certificates to cover indefinite production periods. The longest production period that may be covered by a single component certificate is five years. We believe that allowing component certificates to cover up to five years of production appropriately balances the need for periodic EPA review with the desire to minimize the certification burden. Where components remain unchanged for more than five years, the manufacturer can easily obtain a new certificate using carryover data. This provisions contrasts with the approach we have taken in emission control programs related to exhaust emissions; however, this approach is consistent with Clean Air Act section 213(d), where the Act specifies that EPA may modify the certification protocol where that is appropriate.

On the other hand, since most equipment manufacturers have annual production periods, we are requiring that equipment certificates cover only a single model year, in the same manner as engine certificates.

In response to the comment from Saint Gobain, it is important to note that the provisions related to production periods only affect what can be *produced* under a certificate. In general, anything that is lawfully produced under a valid certificate can be distributed in U.S. commerce later. The exception to this is when new standards take effect. Since these new standards are based on the model year of the equipment, should we tighten the standard for fuel lines in the future, it would not be permissible for an equipment manufacturer to stockpile fuel lines such that the higher-emitting fuel lines are installed after the new standard take effect, even though it may have been produced under a valid certificate meeting the earlier less stringent standard. We allow for normal inventory practices to eliminate product produced under the less stringent standard, much like we have always allowed for equipment manufacturers installing certified engines.

Finally, we disagree strongly with the comments stating that the regulation should allow the continued production and sale of components for which we have voided, revoked, or suspended the certificate. We have no obligation to make noncompliance with the regulations convenient for industry. That would only serve to make such noncompliance more likely. Moreover, we have no similar allowance for equipment manufacturers to use noncomplying engines. To the extent that engine or equipment manufacturers have concerns about potential disruptions to their production, they should address them in their purchase agreements with their suppliers.

See Section 4.7.9 for issues related to replacement components.

4.7.5 Family criteria

What Commenters Said:

Commenter	Response
OPEI and EMA commented that EPA's proposed definition of emission families for fuel tanks to include extraneous factors (such as pigment and UV inhibitors) would create further inefficiencies and inconsistencies with California ARB. This, in turn, would impose additional administrative and product-segregation costs and burdens without any benefits. OPEI and EMA commented that EPA should create a broad evaporative tank family definition similar to California ARB's more stringent approach. There is no reason that a manufacturer can not evaluate the influence, if any, for these additives in the process of determination of a worst case selection for testing. By allowing combinations of these options within a family the certification process	The proposal required that manufacturers differentiate emission families based on additives that "may affect" emissions. We are revising this in the final rule to specify additives that "are expected to affect" emissions. These additives may have a strong effect on emissions, for example, by affecting adhesion of post-processing barrier layers, and in many cases it is not apparent which recipe would represent the worst-case condition. We would expect normal production within a tank model to rely on a consistent formula and manufacturers provided no basis for needing such a variety. As a result, we believe it is necessary and appropriate to require that manufacturers separate their products into different emission families as described above.

burden can be reduced for both the industry and the agency.	
Due to a high number of different tanks (over 70 different versions) in production, OPEI commented that EPA should require a test of best and worst surface to volume ratio of tanks, to reduce the number of tests. The worst emission value would be applicable for certification.	The regulations do not specify additional testing for fuel tanks for different values of surface-to-volume ratio. It is not clear what change is recommended by the comment.
OPEI commented that EPA should provide information on how a manufacturer should establish a family name. (See §1060.230) OPEI requested that EPA reference a guidance document.	To the extent that we establish a naming convention for evaporative emission families, this would occur outside of the rulemaking process.
EMA noted that the evaporative emission family naming convention is not identified in the proposal. EMA recommended that the convention be the minimum required to identify the family. For engine or equipment manufacturers that are also obtaining a Certificate of Conformity to the exhaust emission requirements, the minimum additional information required to indicate the evaporative family should be a two character code established by the manufacturer. For other manufacturers, the evaporative family name should include only a model year designation, manufacturer identification code, and a two character code established by the manufacturer.	We will take these suggestions into account if we pursue a standardized convention for identifying emission families for evaporative emissions.
EMA and OPEI objected to the requirement for manufacturers to submit a new application for a changed FEL with respect to fuel tank permeation (see §1060.225). They noted that this is not required for exhaust emissions.	We agree that equipment manufacturers should be able to change the FEL within an emission family (subject to the same restrictions that apply for exhaust FELS), since they can easily track their own products to know what FEL applies for each tank. This does not apply for tank manufacturers that name an FEL and certify their own tanks. Requiring them to recertify for a changed FEL will help make clear for equipment manufacturers which FEL applies for each tank.
EMA commented on §1060.205 that Small SI engine and equipment manufactures that are required to certify to the running loss requirements specified in §1060.601(c) must have the ability to include in their certification submission component Certificate of Conformity information in place of the specific product selection and testing requirements proposed.	We expect to arrange certification templates to allow for engine manufacturers to include certification information showing that they meet running loss standards. However, as described in §1027.115, we would apply a separate certification fee for evaporative compliance. This fee is considerably lower than the fee for exhaust emission compliance. Also, a single fee would apply for all evaporative compliance in the same emission family as described in §1060.230. This allows manufacturers to group products from the same engine family for exhaust emissions into a bigger combined family for evaporative emissions.
EMA commented on §1060.230(c) that it is inappropriate to include fuel cap design as a criterion in establishing emission families for fuel tanks.	We specify that fuel cap design is relevant for defining emission families only with respect to diurnal emission controls (the proposal also include reference to diffusion emissions, but that is not part of the final rule). Fuel cap design is therefore of interest for Small SI equipment to the extent that they use California's SHED-certified approach and the fuel cap varies in ways that are relevant to diurnal emission control. We believe this is a reasonable approach.

MIC commented that the language of §1060.230(g) says, "Select test components that are most likely to exceed the applicable emission standards. For example, select a fuel tank with the smallest average wall thickness (or barrier thickness, as appropriate) of those fuel tanks you include in the same family." This text appears to be misplaced because 1060.230 addresses how to divide product into engine families, not how to select components for testing.	We agree with this suggestion and have moved the testing-related text to §1060.235

Letters:

Commenter	Document #
MIC	0701
OPEI	0675
EMA	0691

4.7.6 Design-based certification– fuel tank permeation

What Commenters Said:

NMMA expressed strong support for the inclusion of provisions allowing design-based certification for manufacturers of tanks and components. NMMA stated that it will significantly reduce the testing burden placed on manufacturers by providing the option to certify products using a design-based approach. In addition, NMMA commented that such measures are necessary in order to facilitate compliance with the rule across a diverse group of affected businesses. Inca also commented that the design-based certification process should be included in the final rule.

Fluoro-Seal International proposed that undeveloped technology be allowed for future consideration as a compliance option by including an "innovative product" review and qualification procedure in this regulation. Fluoro-Seal commented that allowing for the development of innovative products will enable continuous improvement of materials and systems for lowering emissions from fuel handling systems and recommended the following approach:

(a) EPA would require a manufacturer to demonstrate by clear and convincing evidence that, due to the product's design, delivery system, or other factors, the use of the product will result in lower emissions below the highest level allowed by rule.

(b) A manufacturer (applicant) would apply in writing to EPA for an innovative product exemption claimed under a subsection to be written. The application would include the supporting documentation that quantifies emissions from the innovative product, including the actual physical test methods used to generate the data. In addition, the applicant would provide any information necessary to enable the EPA to establish enforceable conditions for granting the exemption.

(c) Within 30 days of receipt of the exemption application EPA would determine whether an application is complete as required by rule.

(d) Within 90 days after an application has been deemed complete, EPA would determine whether, under what conditions, and to what extent, an exemption from the requirements of said rule will be permitted. An applicant would be allowed to submit additional supporting

documentation before a decision has been reached. The EPA would notify the applicant of the decision in writing and specify such terms and conditions that are necessary to ensure that emissions from use of the product will meet the emissions reductions specified in the rule, and that such emissions reductions can be enforced.
(e) In granting an innovative product an exemption, EPA would specify the test methods for determining conformance to the conditions established. The test methods may include criteria for reproducibility, accuracy, and laboratory sampling procedures.

Letters:

Commenter	Document #
NMMA	0688
Fluoro-Seal	0646
Inca Molded Products	0700

Our Response:

We are finalizing design-based certification provisions for meeting the fuel tank permeation standards. We agree with commenters that design-based certification would reduce the testing burden for manufacturers. However, we believe that this approach should only be used when the technology is well understood and the design constraints can be clearly specified. As proposed, we are allowing design-based certification to the fuel tank permeation standards for metal fuel tanks and for co-extruded fuel tanks with a continuous ethylene vinyl alcohol (EVOH) barrier layer. Metal does not permeate, and the EVOH-barrier tank design specified in the regulations is a well established technology that has long been proven in automotive and other applications as having a permeation rate well below the standards finalized in this rule.

Fluoro-Seal describes an approach in which manufacturers would provide “clear and convincing evidence” that a product will meet the tank permeation standard including test procedures specified by EPA. This approach is very similar to the direct certification procedures for these fuel tanks. To certify a fuel tank family to our standards, manufacturers would perform emission testing on the fuel tank design in the family expected to have the highest permeation rate. The test data are then used to certify a whole family of similar products. In addition, the manufacturer may carry this data over from year to year.

We believe that it is important that the fuel tank manufacturer certify to the standards, rather than a material supplier or a post-process treatment facility. The final permeation performance of the fuel tank depends heavily on the design of the fuel tank and the actual manufacturing process. Specifically for surface treatments, data in the RIA suggests that the performance of these barrier technologies is a function of a wide range of variables, including the material used for the fuel tank, additives to this material, and processing temperatures and pressures that are typically held confidential. For these reasons, we believe that any new treatment process and tank material combination should be tested to ensure proper performance.

We may establish additional design-based certification options where we find that new test data demonstrate that the use of other technology designs will ensure compliance with the applicable emission standards. These designs will need to produce emission levels comfortably below the new emission standards when variability in the emission control performance is considered. In addition, all aspects of these designs would need to be publicly available and quantifiable. For instance, we would not create an design-based certification for a material or process without full public disclosure of all of the characteristics of that material or process relevant to its emission barrier performance. We would also not include products whose emission performance is highly variable due to tolerances in materials or manufacturing processes.

4.7.7 Design-based certification– diurnal

What Commenters Said:

NMMA expressed strong support for the inclusion of provisions allowing design-based certification for manufacturers of tanks and components. NMMA stated that it will significantly reduce the testing burden placed on manufacturers by providing the option to certify products using a design-based approach. In addition, NMMA commented that such measures are necessary in order to facilitate compliance with the rule across a diverse group of affected businesses.

Delphi commented in favor of the proposed provisions for design-based certification, including the canister design requirements and the minimum carbon butane working capacity of 9 g/dL. All carbon grades utilized for automotive and other canisters produced by Delphi have butane working capacities greater than or equal to 9 g/dL. Delphi expressed support for the canister sizing requirements of a minimum of 0.04 liters per gallon of fuel tank capacity for trailerable boats and 0.016 liters per gallon for non-trailerable boats. Delphi stated that these carbon volumes should provide good efficiency while allowing for canisters that can be packaged in boats. Delphi also expressed support for the minimum length-to-diameter ratio of 3.5, and the use of a volume compensator to reduce carbon abrasion.

MeadWestvaco Corporation stated that it supports the proposed design-based certification provisions for diurnal emissions, but expressed concern that the proposed carbon requirements do not include a specification for mean particle diameter. For any given flow rate of air or vapor through activated carbon, the pressure drop across the carbon bed increases with decreasing particle size. MeadWestvaco stated that without a requirement for carbon particle size, a very finely sized activated carbon could be used within the canister that meets the above requirements but has characteristics of very high flow restriction, making the carbon canister unusable. MeadWestvaco Corporation suggested that a minimum Mean Particle Diameter of 3.1 mm, based on ASTM procedure D2862, be included in the design-based certification carbon requirements outlined in § 1060.240(d) to ensure low pressure drop while continuing to maintain carbon functionality.

Letters:

Commenter	Document #
NMMA	0688
MeadWestvaco Corporation	0723
MeadWestvaco Corporation	0724
Delphi	0638

Our Response:

We are finalizing design-based certification provisions for meeting the diurnal emission standards. We agree with commenters that design-based certification would reduce the testing burden for manufacturers. The final design specification for carbon canisters include MeadWestvaco's recommendation that the carbon granules must have a minimum mean diameter of 3.1 mm based on the procedures in ASTM D2862. We believe that this additional specification is necessary to prevent canister designs with high flow restrictions.

4.7.8 Warranty

What Commenters Said:

California ARB noted that EPA proposed a two-year period for emission-related warranties with respect to evaporative emission controls. This period is not long enough to ensure that quality evaporative control devices will be used and will stay consistent with engine warranty periods. ARB recommended a five year warranty period, consistent with engine warranty.

EMA commented that it is not practical for certifying component suppliers to provide an emission-related warranty. The emission warranty requirement should be placed on the engine or equipment manufacturer that assembles the complete evaporative control system with appropriate contractual agreements between the engine/equipment manufacturer and their component suppliers. The general requirements should be revised such that the engine or equipment manufacturer that provides the commercial warranty for an engine or equipment must provide the emission-related warranty. The component supplier will be accountable to the engine/equipment manufacturer by way of the contractual relationship between the parties. Accordingly, EMA commented that §1060.120(a) should be revised to read as follows: "The engine or equipment manufacturer that provides the commercial warranty for an engine or equipment must warrant to the ultimate purchaser and each subsequent purchaser that the new nonroad equipment conforms with the requirement of this part at the time of sale and is free from defects in materials and workmanship that may keep it from meeting these requirements."

Letters:

Commenter	Document #
California ARB	0682
EMA	0691

Our Response:

California ARB's comment confuses useful life and warranty periods. Current regulations for Small SI in part 90 and Marine SI engines in part 91generally specify warranty periods of two years. EPA's general approach in more recent rulemakings is to set warranty periods to be half of the applicable useful life. This approach for evaporative requirements takes a similar approach. We expect this to have very little impact on the way manufacturers design or produce their products. Evaporative emission controls are generally not susceptible to defects that would cause an owner to bring the product in for repairs.

In the final rule, we require Small SI equipment manufacturers to certify with respect to evaporative emissions. For Marine SI vessel manufacturers, certification is optional. For both cases, we specify that component manufacturers may meet their warranty obligations if a certifying equipment or vessel manufacturer meets warranty requirements. If a vessel manufacturer does not certify, the component manufacturers would be expected to make an agreement with the vessel manufacturer to process warranty claims on their behalf, or otherwise to combine efforts to fulfill the warranty obligation.

4.7.9 Replacement components

What Commenters Said:

NMMA noted that EPA proposed in §1060.601(b)(3) that in cases where a fuel tank is replaced, the replacement tank should have the same or lower FEL as the original fuel tank. If such a tank is not available, EPA proposed to allow equipment owners to request an exemption from the anti-tampering provisions if there is no low-FEL tank available. NMMA commented that this situation is very likely to occur in the future as molded tanks eventually wear out and the older molds are no longer available. NMMA agreed that such situations should be exempt from the tampering provisions. However, customers in these situations should be able to put whatever tank fits in the vessel without having to request an exemption. NMMA commented that an exemption process is administratively burdensome and impractical and the requirement for a formal request should be removed from the final rule.

Arctic Cat requested that specific language be added that would allow more flexibility in supplying replacement fuel tanks. Arctic Cat noted that since the vehicle emission control information (VECI) label specifically states the permeation family name, they have been told by certification staff that replacement tanks that do not match the information on the VECI label would not be allowed. To recreate the precise tank that was made in the past has significant cost impact and adds little value for anyone. In fact, the high cost of these replacement tanks could motivate the customer to find an alternative that may result in much higher permeation. Arctic Cat does not feel that EPA's original intent was to disallow flexibility for providing replacement tanks by adding requirements to include the permeation family name on the VECI label. They requested the addition of a paragraph that allows any fuel tank from a permeation family that has already been certified under the same or other engine family to be used as a replacement tank as long as it meets the same FEL or standard as the tank being replaced.

OPEI commented that they agreed with the provision to allow equipment owners to ask for an exemption from the tampering prohibition if there is no low-FEL tank available. The replacement tank would still need to meet applicable standards, but would not need to meet the more stringent emission levels reflected by the old tank's FEL. OPEI believes there should be special provisions to allow historical fuel tanks (fuel tanks used on products produced before low permeation regulations were enforced) to be supplied as replacement parts for all time for those products.

Letters:

Commenter	Document #
NMMA	0688
Arctic Cat	0709
OPEI	0675

Our Response:

We have revised the regulations to clarify that new fuel tanks need not be certified to the permeation standards if they will be installed as replacement tanks where the original tank was not subject to emission standards. This allows for continued production of replacement fuel tanks that are identical to the original tanks, or otherwise in something other than a low-permeation configuration.

In cases where replacement tanks will be installed in equipment in which the original tanks were certified with an FEL below the applicable standards, we agree with the commenters that it would be inappropriate to require manufacturers to match that same level of emission control with the replacement tank, or to require owners to go through a process to get EPA approval for a waiver from this requirement. As long as these replacement tanks are certified, we will consider them to be compliant with EPA requirements. This avoids imposing the burden of tracking product and prevents a situation where manufacturers are unable to supply low-permeation fuel tanks of a different configuration than the original fuel tank.

Equipment manufacturers may identify multiple valid fuel tank models (or emission families) on their labels or in their applications for certification. If they do this it will be easier to establish that equipment with a replacement fuel tank that differs from the original configuration is still in a certified configuration. This would also accommodate a production scenario in which the equipment manufacturer includes different kinds of fuel tanks for a given equipment model (for example, by sourcing fuel tanks from different component manufacturers).

4.7.10 Other certification issues

Summary of Comment	Response
EMA commented on §1060.225(c) that the requirement to supply additional test data within 30 days of EPA's request is not appropriate. The requirement should specify that manufacturers must supply data within 30 days after completion of the testing associated with EPA's request.	We agree that it may take more than 30 days to respond to certain requests. For example, any testing that requires preconditioning components would take several weeks to be able to run a valid test. As a result, we are modifying the regulation to specify that the manufacturer must either give us the information within

	30 days or give us a plan for providing the information in a timely manner.
EMA commented on §1060.235(f) that the method used to determine the official test results must be identified for cases when more than one unit is tested. EMA suggested that the average of all test results should be considered the official test results.	Section 1060.801 defines the "official emission result" as the measured emission level from a certification test on a given tested component. The "certified emission level" is defined as the highest official emission result from a family. This approach is consistent with the terminology and practice for exhaust emission testing for all nonroad engines.
EMA commented that a demonstration of durability as part of the determination of compliance for a given fuel system technology is appropriate. However, due to the long term stabilization requirement to generate test result for permeation testing it is not practical to utilize deterioration factors as typically applied to exhaust emissions.	We adopted an approach that relied on deterioration factors for recreational vehicles, but have since concluded that deterioration factors are not a sensible approach for testing and certifying fuel tanks for permeation emissions. We did not include this approach in the proposed rule or this final rule. We expect to revise the rule for recreational vehicles to align with this new approach.
EMA noted that §90.127(c)(2) requires the engine manufacturer to provide appropriate instructions to equipment manufacturers adding a fuel line so that they may meet the requirements set forth in §90.128, if they add fuel line. However, EPA does not indicate what the approval process is for such instructions. EMA commented that this section should be revised to read as follows: "It is not a violation to introduce your engines into U.S. commerce if other companies add fuel lines when installing your engines pursuant to §90.128. [Emphasis added.]	We believe it is not necessary to amend the regulation as recommended by EMA. The text simply describes how responsibilities for including compliant fuel lines fall on engine and equipment manufacturers. The installation instructions should make clear that any additional fuel line coming from the equipment manufacturer is their responsibility.
EMA noted that the manner in which installation instructions are provided to engine installers will vary significantly depending on the business relationship between the engine manufacturer and equipment manufacturer. EMA commented on §90.128(c) that instead of requiring the manufacturer to provide an explanation of how the manufacturer will ensure that installers are informed of the installation instructions, the manufacturer should be required to retain records demonstrating how the notification was provided.	EMA is not objecting to the requirement to notify installers regarding the installation instructions. In effect, their request is to avoid committing to a specific plan ahead of time and instead document afterward how this occurred. We believe it is quite appropriate to identify a plan for communicating installation instructions to installers. This might involve a variety of methods and manufacturers would not need to identify the method used for each company. It would be enough to identify the nature of the communications that are intended to ensure proper installation.
OPEI noted that §1060.520 does not define the quantity of fuel tanks required for testing and certification. The quantity of tanks tested during cert should be discussed with industry.	We have indeed had these discussions and concluded that testing a single tank is appropriate, except that three tests are required for certifying based on a Family Emission Limit. There was some interest in testing more than one tank for other families, but we believe this is best left to the manufacturer's discretion. However, we may require manufacturers to test additional fuel tanks if we believe that is necessary to ensure proper certification.

Letters:

Commenter	Document #
EMA	0691
OPEI	0675

4.8 Test procedures

4.8.1 Fuel line permeation– preconditioning

What Commenters Said:

NMMA and Mercury Marine expressed support for the proposed procedures for fuel line permeation testing. NMMA noted that it would defer to its members' comments on whether a longer soak period would be necessary for fuel lines.

In its comments, OPEI noted that the proposed fuel line preconditioning period is for 4 to 8 weeks and 23°C ± 5°C. OPEI expressed concern that this may lead to too much variation in test procedures and results. Therefore, OPEI recommended that a single preconditioning period be set, such as 8 weeks, so that any in-use or compliance checks EPA conducted would agree with manufacturer testing. In addition, OPEI recommended that the temperature tolerance be changed from ± 5°C to ± 2.5°C.

California ARB commented that the proposed preconditioning soak time for fuel lines should be at the higher end of the proposed soak times (8 weeks or more). The commenter noted that the Society of Automotive Engineers (SAE) J1737 recommends 1000 hours (approximately 6 weeks) to sufficiently achieve steady state for 60°C. California ARB stated that if the temperature is lower than 60°C, the overall soak time should be lengthened. Correspondingly, California ARB recommended that, because the proposed preconditioning soak temperature is 23°C, the soak time should be substantially longer to ensure the permeation rate has reached steady-state. California ARB's concern was that a permeation rate calculated before it reaches steady-state may represent a lower rate than the actual permeation rate of the fuel line. California ARB commented that a higher test temperature of 40°C would shorten the preconditioning soak time.

Letters:

Commenter	Document #
NMMA	0688
Mercury	0693
California ARB	0682
OPEI	0675

Our Response:

The purpose of the proposed preconditioning soak period was to ensure that the fuel line had reached a stable permeation rate prior to the permeation test. We believed that a fuel line with a permeation rate at the proposed standard of 15 $g/m^2/day$ would require approximately 4 weeks to reach a steady permeation rate. For more fuel resistant products, we believed that a longer fuel soak period may be necessary to make an accurate measurement of permeation. For this reason, we proposed a soak period of 4 to 8 weeks to allow for longer soak periods, if necessary.

According to SAE recommended practice,[5] a fuel line permeating at 10-20 g/m^2/day at 60°C fuel should have a preconditioning soak period of approximately 6 weeks at 60°C. Based on the relationship between permeation and temperature, it is reasonable to conclude that a 6 week preconditioning soak period at 23°C is appropriate for testing a fuel line with a permeation rate of 10-20 g/m^2-day at 23°C. For fuel lines with a lower permeation rate, a longer soak time is necessary to ensure a stable permeation rate. Considering that fuel lines will likely be certified with a compliance margin below the standard, we believe it is reasonable to conclude that an 8 week preconditioning soak period is appropriate for most fuel lines subject to this standard.

The intent of the proposed wide temperature range for the preconditioning soak was to simplify the preconditioning soak by requiring less sophisticated temperature control. We believe that this tolerance can be allowed without significantly affecting the results of the permeation test.

Manufacturers commented that the preconditioning soak period must be rigid to ensure that in-use compliance testing would match manufacturer testing. In most cases, fuel lines sampled for in-use testing would be exposed to fuel for more than 8 weeks. For this reason, we believe that it is important that certification testing include a minimum soak period that ensures a stable permeation rate. In addition to the 8 week preconditioning soak period, we are finalizing a requirement that the fuel line should be preconditioned for a longer period, based on good engineering judgment, if necessary to achieve a stable permeation rate.

For fuel tank testing, the preconditioning soak period may be shortened if performed at elevated temperature. Consistent with this provision, we are finalizing a provision that the fuel line preconditioning soak period be 4 weeks if performed at 43°C ± 5°C.

4.8.2 Fuel line permeation– test fuel

What Commenters Said:

California ARB commented that the proposed test fuel, CE10, should continue to be the test fuel of choice because it is a known blend and is readily available. California ARB stated that allowing Indolene with 10 percent ethanol (IE10) should not be adopted because IE10 has a lower permeation rate than CE10, and its use would allow less efficient control technology to pass the fuel permeation test procedure. NMMA and Mercury Marine also expressed support of the proposed test fuel for fuel line permeation.

EMA commented that EPA incorporate the California ARB Tier 3 methods as specified in CCR 2754(a)(1)(C) for measurement of fuel line permeation. EMA commented that the alternative should be allowed of using data generated using SAE J30 test method with appropriate adjustments to test temperature and test fuel per Phase 3 requirements.

5 Nonmetallic Fuel System Tubing with One or More Layers," SAE Recommended Practice J2260, November 1996.

OPEI commented that the water limit in the test fuel should be limited to 500 ppm to avoid interaction with nylon materials. OPEI stated that nylon materials have an affinity for water, so this can affect the accuracy of permeation tests. In this regard, OPEI argued that harmonization with California ARB test fuel (E0) would be recommended. OPEI also recommended that manufacturers should be provided the flexibility to conduct permeation emission testing with a variety of fuels to minimize the duplication of testing and also overall testing burden. No standard level adjustment or other means should be included to account for the small differences in permeation rate for relatively similar fuels. OPEI did recognize that testing without ethanol does produce a significantly different permeation rate for some fuel line technologies and recommended that E0 should not be allowed without development of an appropriate adjustment factor to preserve a level competitive playing field.

In later discussions, OPEI commented that their support of a limit of 175 $g/m^2/day$ for cold weather fuel lines is predicated on using IE10 as a test fuel.[6] They stated that the fuel line test data supplied to EPA by OPEI was based on this test fuel and supplied further test data using fuel CE10 which showed higher permeation results. As a result, OPEI recommended a test fuel of IE10 for cold weather fuel lines.

Letters:

Commenter	Document #
NMMA	0688
Mercury	0693
California ARB	0682
OPEI	0675
EMA	0691

Our Response:

We are finalizing a test fuel of CE10 for fuel line permeation testing. Fuel CE10 is widely used by material manufacturers and hose manufacturers for determining fuel resistance from fuel system materials, particularly those used in fuel lines. In addition, the technological feasibility of the fuel line standards was largely based on testing using fuel CE10. Based on data presented in the RIA, permeation testing based on IE10 results in lower measured emissions for most fuel system materials.

The California ARB Tier 3 methods as specified in CCR 2754(a)(1)(C) for measurement of fuel line permeation include a number of test fuels that may be used. Two of these test fuels are fuel CE10 and California certification gasoline which does not include ethanol. We are not incorporating the California ARB method because we believe that the test fuel for fuel lines should include ethanol. Gasoline containing ethanol is widely used in-use and ethanol can have a large effect on the permeation rates of fuel lines. In the case where a manufacturer wishes to use a single test fuel for certification to the California ARB and EPA standards, CE10 may be used in both instances.

[6] "HHPC Evaluation of EPA Proposed Phase 3 Rule for Fuel Line Permeation," Outdoor Power Equipment Institute, Presentation to EPA, February 5, 2008

We believe it would not be appropriate to develop an adjustment factor for the use of fuel with and without ethanol for all fuel lines. As shown in the RIA, the effect of ethanol on permeation varies greatly for different materials used in fuel lines.

We are finalizing specifications for fuel ethanol blended into test gasoline based on standard industry practice. Specifically, we are incorporating by reference ASTM D4806-07[7] which specifies a maximum water content, in the ethanol, of 1 percent by volume. When this ethanol is blended into gasoline at 10 percent, this would result in a maximum water concentration of about 1,000 ppm. Because this is a maximum, manufacturers testing hygroscopic materials would be able to test using fuels with lower water content.

One exception is for fuel lines on cold-weather handheld products. In this case, the standard is based on a test fuel of IE10, which is EPA certification gasoline blended with 10 percent ethanol by volume. Note that the standard is based on test data in which IE10 was used. If we had used CE10 as a test fuel for these products, then the numerical level of the standard would have needed to be raised significantly to achieve equivalent emission reductions.

4.8.3 Fuel line permeation– measurement method

What Commenters Said:

NMMA and Mercury Marine expressed support of basing the fuel line permeation test procedure on a weight-loss method similar to what is specified in the recommended practices in SAE J30 and J1527, with adjustments (discussed above) to the preconditioning soak and test fuel.

OPEI commented that handheld fuel lines are typically shorter than the length required for testing under SAE J30. OPEI stated that, if EPA will perform in-use testing of handheld fuel lines, a different test procedure is required which will need correlation to SAE J30.

California ARB commented that EPA should consider increasing the test temperatures for fuel line permeation testing to 40°C because, as permeation rates lower, accurate measurements become increasingly difficult. Also, a higher test temperature would shorten the preconditioning soak time; newer technology increases a component's resistance to permeation, thus taking longer to reach steady-state conditions.

California ARB also commented that the permeation test procedure and standards for hoses and primer bulbs should require only the entire hose assembly be tested as a unit and not allow for individual components. California ARB test data and field surveys show that many consumers assemble the individual component parts incorrectly. Therefore, California ARB supports testing the hose and primer bulb as an assembly, thus reducing the excess emissions caused by improper assembly.

7 ASTM International, "Standard Specification for Denatured Fuel Ethanol for Blending with Gasoline for Use as Automotive Spark-Ignition Engine Fuel, ASTM D4806-07, 2007.

EMA commented that EPA should work with California ARB to ensure that evaporative emission test procedures are aligned to the greatest extent possible. Therefore, EMA recommended that the final rule include or incorporate by reference California ARB Tier 3 methods as specified in CCR 2754(a)(1)(C). Alternatively EMA commented that we should allow certification using data generated using SAE J30 test method with appropriate adjustments to test temperature and test fuel per Phase 3 requirements. EMA argued that methods based on the SAE J30 test method has been the most widely used method for certifying to California ARB Tier 3 fuel hose permeation requirements.

Harold Haskew & Associates (HH&A) commented that permeation mass measurements using ethanol containing fuels will produce different results if determined by the weight loss method and compared to the current SHED procedure. The issue here is that if one tests for permeation using a SHED, and uses the Federal calculations for mass emissions found in 40 CFR §86.143-96, the ethanol fraction of the permeate is reported as “equivalent gasoline.” The equivalent gasoline deletes the oxygen mass and lowers the hydrogen/carbon fraction from 3 to 2.3, both resulting in a lower than real mass calculation. As a result, if the SHED mass emissions measurement is compared to a gravimetric (weight loss) measurement, the SHED value will under-report the true value.

HH&A recommended a revision to the SHED mass calculation where the ethanol contribution to permeation would be measured separately. A Flame Ionization Detector would be used to measures total hydrocarbons. This reading would then be corrected by subtracting the concentration of ethanol measured by the gas chromatograph (GC). This corrected reading would be used to compute non-ethanol hydrocarbon mass emissions. To this value you would add the ethanol concentration converted to mass using the true mass of the ethanol molecule.

Letters:

Commenter	Document #
NMMA	0688
Mercury	0693
California ARB	0682
HH&A	0640
EMA	0691
OPEI	0675

Our Response:

As proposed, the fuel line test procedures will reference the weight loss test procedure in SAE J30 or J1527 with modifications to the fuel line preconditioning procedure and test fuel. Both test procedures are similar in that a reservoir and weight loss method is used. Both SAE J30 and J1527 specify minimum fuel line lengths. Especially for in-use testing, it may not be possible to identify fuel line samples that meet these minimum length requirements. Therefore, we have included a provision to allow fuel line permeation testing to be performed with shorter sample sections. Good engineering judgment would be required in testing shorter fuel line samples. For instance, the reservoir size may need to be scaled down for the smaller fuel line volumes. Also, additional steps may be necessary to ensure that air is not trapped in narrow diameter fuel lines beyond tapping the hose (as recommended in SAE J30).

We are retaining the proposed nominal test temperature of 23°C for fuel line testing. This is the same temperature recommended in SAE J30 for weight loss testing and is consistent with our test procedures for recreational vehicles. However, because testing at 40°C would result in an increased permeation rate, we would accept data at this temperature as well. Many of the fuel lines certified to the California ARB standards were tested at 40°C on fuel CE10 and were below our permeation standards. As discussed above, we would accept a shorter preconditioning soak at a nominal temperature of 40°C.

We are finalizing fuel line permeation standards that will apply to primer bulbs and fuel hose independently. In many cases, the fuel hose and primer bulbs may be produced by different manufacturers. This approach would allow individual component manufacturers to certify to our standards. As an alternative, we will allow manufacturers who supply a whole primer bulb and fuel line assembly to test the assembly, as a whole, for certification to the fuel line permeation standards.

California ARB's regulations, in CCR 2754(a)(1)(C), reference SAE J1737[8] as the method for measuring permeation from fuel lines. These recommended procedures use a recirculation technique whereby nitrogen is flowed over the test sample to carry the permeate to adsorption canisters. Permeation is determined based on the weight change of the canister. This method was intended to provide a greater level of sensitivity than the weight loss method specified in SAE J30 and J1527 so that lower rates of permeation could be measured. As an alternative, we will accept permeation data collected using the methodology in SAE J1737. If this alternative is used, the same test fuel, test temperature, and preconditioning period must be used as for the primary (weight-loss) test method.

In addition, manufacturers may request the use of other procedures provided that these procedures are equivalent or more accurate than the primary test procedures or if it can be demonstrated that the use of the alternate test procedure would not affect the ability to demonstrate compliance. In the case of SHED testing, the manufacturer would need to demonstrate that it is correctly accounting for the ethanol content in the fuel. One approach may be to use a procedure similar to that described above in the HH&A comments.

4.8.4 Fuel tank permeation– preconditioning

What Commenters Said:

NMMA commented that the shortened tank permeation test procedures for recreational vehicles specified in a guidance letter from EPA be allowed for marine fuel tanks.[9] This

8 SAE Recommended Practice J1737, "Test Procedure to Determine the Hydrocarbon Losses from Fuel Tubes, Hoses, Fittings, and Fuel Line Assemblies by Recirculation,"1997, (Docket EPA-HQ-OAR-2004-0008-0178).
9 Dear Manufacturer Letter from Merrylin Zaw-Mon, Re: Alternative Test Procedures for Measuring Fuel Tank Permeation from Highway Motorcycles, ATVs, Off-highway Motorcycles and Snowmobiles, Document No. CCD-05-14 (MC/ATV/OFMC/ICI/Snowmobiles), Aug. 17, 2005.

guidance included a shortened preconditioning soak period of 10 weeks if performed at an elevated temperature of 43°C ± 5°C.

EMA commented that EPA should work with California ARB to ensure that evaporative emission test procedures are aligned to the greatest extent possible. EMA recommended that the final rule include or incorporate by reference the California ARB's TP-901 procedures including an alternative permeation preconditioning soak temperature of 40°C ± 5°C. OPEI also requested that EPA accept the California ARB preconditioning procedure as an alternate test method. EMA claimed that testing has shown that most materials meeting the proposed permeation limits attain a steady-state permeation rate after soaking for less than 10 weeks. Therefore, EMA recommended a process for alternative procedure approval in which manufacturers would be allowed to obtain agency approval to utilize shorter stabilization periods if they can demonstrate that permeation rates have stabilized in this time period.

EMA also commented that the requirement that the tanks be sealed during their pre-test conditioning soak is not viable. EMA argued that there is no data available to support that sealing the tank during the conditioning soak is critical to accurate characterization of the material's permeability; therefore, the requirement for sealing tanks during the preconditioning soak should be removed.

OPEI expressed support for the option of allowing the durability testing to be considered as part of the preconditioning soak period.

Letters:

Commenter	Document #
NMMA	0688
OPEI	0675
EMA	0691

Our Response:

For fuel tank testing, the preconditioning soak period may be shortened to 10 weeks if performed at an elevated temperature of 43°C ± 5°C. This is consistent with current practices for recreational vehicles. In addition, the preconditioning soak temperature overlaps significantly with the preconditioning soak temperature in TP-901. Therefore, a single tank could be preconditioned, simultaneously, under both the EPA and California ARB procedures by simply holding the temperature to 41.5°C ± 3.5°C. The intent of the wide temperature range for the preconditioning soak is to simplify the preconditioning soak by requiring less sophisticated temperature control. However, as noted above in the manufacturer comments on the fuel line preconditioning soak temperature, much tighter temperature tolerances can be maintained.

EMA did not present data to support its claim that materials reach a steady-state permeation rate in less than 10 weeks. We believe that the final preconditioning soak periods are appropriate as a minimum for fuel tanks meeting the permeation standards. These soak periods are consistent with recommended practice for permeation testing of polymer-based fuel tubing[10] and provide some assurance that the fuel tanks have reached a stable permeation rate. In the case of a very low permeation tank, we would expect the manufacturer to use a longer soak period, as appropriate.

EMA did not provide any information on why they did not consider sealing tanks during the preconditioning soak to be viable. All of the fuel tanks tested at EPA were sealed during the preconditioning period without incident. The purpose of sealing the fuel tank is to keep fuel and fuel vapor in the fuel tank, to the extent possible, during the preconditioning period. In the case where fuel was dispensed at a temperature below the soak temperature, it would be possible for the fuel tank to pressurize if the tank were sealed prior to the fuel temperature reaching the soak temperature. In this case, it would be acceptable to allow reasonable time for the test fuel to approach the soak temperature, prior to sealing, to prevent over-pressurization of the fuel tank. To prevent gross evaporation of fuel vapors during this period, the venting of the tank should be no greater than needed to prevent over-pressurization of the fuel tank.

Provided that fuel is continuously in the tank during the durability testing, manufacturers may include this as part of the preconditioning soak.

4.8.5 Fuel tank permeation– durability testing

What Commenters Said:

NMMA commented that the fuel tank permeation testing guidance provided for recreational vehicles should apply to marine fuel tanks as well.[11] NMMA stated that this guidance retained the integrity of the permeation tests but greatly reduced the testing burden imposed on recreational vehicle manufacturers by providing optional ways to shorten and minimize the required test procedures. Specifically, NMMA and Inca Molded Products argued that fuel tanks not using surface treatment technologies, e.g., fluorination, to meet the permeation standards should not be subject to the slosh test because sloshing would not negatively impact the permeation of these types of tanks. In addition, NMMA and Inca Molded Products commented that the ultraviolet light exposure test does not make sense for fuel tanks installed inside marine vessels. With these modifications, Inca Molded Products expressed general support of the preconditioning durability procedures.

Grady-White Boats commented that there is no need or benefit in requiring ultraviolet exposure testing of tanks that will not be exposed to sunlight once installed. Grady-White also commented that there is no benefit in slosh testing tanks that are not using surface treatment barriers to meet permeation requirements.

10 Nonmetallic Fuel System Tubing with One or More Layers," SAE Recommended Practice J2260, November 1996.
11 Dear Manufacturer Letter from Merrylin Zaw-Mon, Re: Alternative Test Procedures for Measuring Fuel Tank Permeation from Highway Motorcycles, ATVs, Off-highway Motorcycles and Snowmobiles, Document No. CCD-05-14 (MC/ATV/OFMC/ICI/Snowmobiles), Aug. 17, 2005.

EMA commented that manufacturers should be allowed to request approval on a case by case basis in order to eliminate redundant testing or preconditioning requirements. This would include pressure cycling for tanks that have venting mechanisms that preclude a pressure increase or ultraviolet light exposure for tanks that are enclosed to prevent exposure to the sun. OPEI requested that EPA provide data to show that the durability test requirements properly represent real use simulation and can properly identify failed/compliant products at the end of 5-year useful life.

EMA commented that EPA should work with ARB to ensure that evaporative emission test procedures are aligned to the greatest extent possible. EMA and OPEI reasoned that aligning the EPA and California ARB durability test procedures would significantly reduce testing burden with no detriment to the environmental benefits of this rule. EMA and OPEI commented that EPA should accept testing performed following the California ARB procedures in TP-901. These test procedures include a shaker method for slosh. OPEI comments that a significant amount of the data utilized in the rule making utilized the California ARB TP-901 shaker method for slosh.

EMA commented that tank systems that do not include features for pressure or vacuum retention, e.g. valves, should not require pressure-vacuum cycling as part of their durability demonstration. To allow harmonization with California ARB, EMA stated that the requirements for pressure and vacuum test values must be expanded to within 10 percent of design pressure-vacuum limits and the number of cycles reduced to 1000 through either a change in the proposed requirements or an approved alternate without request by the manufacturer.

OPEI commented that the UV test is not necessary on tanks made of materials containing UV inhibitors or nylon tanks which are resistant to UV rays. Additionally, the UV test should not be required on HDPE tanks that a manufacturer can prove that less than 50 percent of the tank's external surface would be exposed to UV light. OPEI stated that clarity is needed in how the tank should be positioned for such a test. EMA commented that the specified UV criteria, 0.4 W-hr/m^2/min, represents solar load on a clear day in the Southern U.S. EMA stated that the optional natural sunlight exposure does not specify where the exposure is conducted or the quality of the daylight raising concerns regarding equivalence between these options. In addition, the term "daylight hours" is not defined. In order to provide alignment with California ARB requirements, EMA commented that the UV requirements should be deleted. EMA argued that no data has been included in the record of this rulemaking that indicates that UV degradation of fuel tank permeation exists.

With regard to EPA's request whether additional durability tests are necessary, OPEI commented that there is no need to add additional durability tests because other safety standards exist (ISO/ANSI) covering requirements for tanks on Small SI products. In addition they stated that manufacturers are keenly aware of the critical durability testing and validation requirements in order to produce safe products. This can include cold drop testing, impact testing, pressure cycle testing, vibration testing, burst testing, leak testing, etc. New low permeation tank technologies will vary from manufacturer to manufacturer and the new technologies may involve new materials and processing equipment. OPEI commented that equipment manufacturers will be very cautious with these new technologies and continue with existing durability/validation testing and may expand upon them with additional testing in order to validate the new low permeation fuel tank designs. Because the equipment manufacturers have a better understanding of the way the specific equipment is used, OPEI commented that the equipment manufacturers would be the best judge to determine what durability testing and validation testing is required. Therefore, OPEI commented that additional regulatory compliance could be complex and/or misrepresentative for specific equipment usage, and, therefore, should not be required.

Inca molded products commented that, in some cases, molded parts made from new materials are able to meet all of the proposed durability requirements and pass the permeation test, but fail impact testing. Promens testified that they have worked with barrier layer materials that have increased the brittleness of the fuel tank. Promens presented information on the results of dart impact testing on these tanks showing ductile failures. Promens stated that use of the dart impact test, also known as the Bruceton Staircase Method, has proven to ensure a safe and reliable product and argued that marine fuel tanks must be able to pass this test. Promens argued that crash impacts testing such as described in SAE 5288 Snowmobile fuel tank impact test or SAE 51241 Motorcycle fuel tank lateral impact test do not directly test the integrity of the material. These tests only verify the integrity of the mounting of the tanks within structures because both SAE tests described have the tanks mounted to structures, and the tanks are not directly impacted. Promens commented that the arm impact test should be included as a preconditioning test or included it as part of the ABYC requirements.

Letters:

Commenter	Document #
NMMA	0688
OPEI	0675
Inca Molded Products	0700
OPEI	0691
Promens (hearing)	0642
EMA	0691
Grady-White Boats	0697

Our Response:

We agree with commenters that the durability testing requirements are not necessary for all fuel tank designs. In the proposal, we stated that one or more durability tests could be waived if we determine that omission of these tests would not affect the emissions from the fuel tank. In the guidance letter referenced above for recreational vehicles, we clarified that minimized durability testing may be appropriate for some tank materials and manufacturing processes. In the final rule we are specifically excluding metal tanks and other tanks using direct material solutions in the molding process from the durability test procedures by stating that they only apply to fuel tanks using surface treatments or post-processing barrier coatings as a permeation barrier.

The durability test requirements are not intended to represent real use simulation of fuel tanks on equipment over the five year useful life. Rather these tests are intended to identify potential problems with the permeation barrier on fuel tanks. The slosh testing and pressure vacuum testing are based on a draft recommended SAE practice and are intended to address surface wear and microcracking concerns. One million slosh cycles does not necessarily represent what each tank will see in-use, but does present a reasonable method for determining if an improperly applied treatment will wear off easily. The pressure-vacuum test provides a method for flexing the fuel tank to ensure that the coating will flex with the tank walls without easily breaking down. The purpose of the UV exposure test is to address concerns that certain treatments or coatings may break down when exposed to sunlight. In the case of surface treatments, UV additives do not protect the treatment, and certain UV additives may even hamper the proper application of the barrier. During testing, the amount of the surface exposed to UV light on the fuel tank should be representative of the largest amount of sunlight that the fuel tank would likely be exposed to. Good engineering judgment should be used, in the case of the direct natural sunlight option, to achieve a UV load comparable to the laboratory specification.

We do not believe it is necessary to modify the durability procedures to achieve harmonization with California ARB. TP-901 already specifically allows the use of the EPA test fuel and slosh testing procedure. Most fuel tanks are not pressurized in use. For non-pressurized fuel tanks, California ARB does not require pressure-vacuum testing, making the EPA test the only one necessary. For pressurized fuel tanks, the EPA test is likely to be the more stringent procedure. Both EPA and California ARB allow manufacturers to request alternative test procedures provided that these procedures are equivalent or more stringent than the primary procedures. California ARB does not currently require UV exposure testing; however, performing this test would not be expected to disqualify a fuel tank from being compliant with the TP-901 procedures. Finally, as discussed above, many fuel tanks will not be subject to the EPA durability testing.

The durability tests are not intended to address the integrity of the fuel tank itself, but rather to provide some assurance of the durability of the permeation barrier. We believe that manufacturers are best positioned to determine the appropriate methodology for determining product durability from a performance perspective. While consumers may not be aware of failures in the permeation resistance of a fuel tank, a fuel leak is quickly apparent. Manufacturers have a significant incentive to produce durable fuel tanks. In the marine industry, Coast Guard safety standards are augmented by consensus standards developed under the American Boat and Yacht Council. Land based equipment manufacturers have developed consensus standards such as ANSI and SAE recommended practices. In addition, several manufacturers have indicated that they have developed their own durability requirements. Given these factors, we are not expanding the durability testing procedures to address fuel tank integrity.

4.8.6 Fuel tank permeation– test fuel

What Commenters Said:

OPEI commented that CE10 can be acceptable if the water content and aldehyde content of the ethanol is defined. They recommended that aldehydes and ketones be specified as being less than 100 ppm and that the water content be limited to 500 ppm. OPEI stated that splash blending with denatured alcohol should be avoided due to the high water content and the negative effects (including repeatability) this can have on permeation tests with nylon fuel tanks.

OPEI also commented that California ARB and EPA use different test fuels. OPEI requested that EPA and California ARB harmonize on a complete test procedure or that EPA accept California ARB test data (corrected for fuel types) as proof of compliance. In conjunction, OPEI commented that any EPA testing should use the same procedures as that used for certification.

California ARB commented that CE10 should be the test fuel of choice because it is a known blend and is readily available. California ARB recommended that the proposed test fuel of EPA certification fuel with 10 percent ethanol (IE10) should not be adopted because IE10 has a lower permeation rate than CE10 and it is expected that its use would allow less efficient control technology to pass the fuel permeation test procedure.

Letters:

Commenter	Document #
OPEI	0675
California ARB	0682

Our Response:

We are finalizing a test fuel of certification gasoline blended with 10 percent ethanol (IE10) for fuel tank permeation testing. The technological feasibility of the fuel tank permeation standards was largely based on testing using this test fuel. In addition, IE10 is much more representative of ethanol-gasoline fuel blends seen in use than CE10. While we are adopting a CE10 fuel specification for fuel lines to reflect established industry practice and the data available to set emission standards, these factors do not come into play for fuel tank testing.

The California ARB test methods as specified in TP-901 for measurement of fuel tank permeation specify California certification gasoline or EPA certification gasoline, neither of which contain ethanol. We are not incorporating the California ARB method because we believe that the test fuel for fuel tanks should include ethanol. Gasoline containing ethanol is widely used in-use and ethanol can have a large effect on the permeation rates of fuel tanks. In the case where a manufacturer wishes to use a single test fuel for certification to the California ARB and EPA standards, the manufacturer may request approval of an alternative test fuel from California ARB as described in TP-901. Several executive orders have been issued by California ARB in which the test fuel contained ethanol.

We do not believe that it would be appropriate to develop an adjustment factor for the use of fuel with and without ethanol for all fuel tanks. As shown in the RIA, the effect of ethanol on permeation varies greatly for different materials and permeation barriers used in fuel tanks.

We are finalizing specifications for fuel ethanol blended into test gasoline based on standard industry practice. Specifically, we are incorporating by reference ASTM D4806-07 which specifies a maximum water content, in the ethanol, of 1 percent by volume. When this ethanol is blended into gasoline at 10 percent, this would result in a maximum water concentration of about 1,000 ppm. Because this is a maximum, manufacturers testing hygroscopic materials would be able to test using fuels with lower water content. ASTM D4806-07 states that only gasoline compounds in the gasoline boiling range may be used as denaturants and specifically states that ketones may not be used as denaturants. This recommended practice makes no specific mention to aldehydes; however, commenters did not present information on why they believed that aldehyde content should be limited or if aldehydes are even commonly found in denatured ethanol. In any case, we believe that using the industry standard specification for denatured ethanol will provide for a test fuel that is representative of in-use blends.

4.8.7 Fuel tank permeation– measurement method

What Commenters Said:

California ARB commented that the proposed fuel tank test procedures have no definitive way of determining the stability of the permeation rate for fuel tank testing. California ARB recommended that values be obtained for multiple days and a correlation coefficient be applied. The soak time for low-permeation fuel tanks may not be long enough to reach equilibrium. By not having this method for stability, the actual permeation rate may be higher than calculated.

OPEI commented that the 14-day test period does not agree with California ARB practice and may be questionable engineering judgment. OPEI suggested EPA require that a minimum of 4 weigh points be required in the 14-day period (including the 0-day measurement). If the data is suspicious, OPEI recommended that the test could be extended until some level of confidence is reached which may not necessarily require an additional 14 days.

EMA commented that EPA should work with California ARB to ensure that evaporative emission test procedures are aligned to the greatest extent possible and recommends using the test procedures specified in TP-901. California ARB's procedure requires daily measurements that ensure the permeation rate is at steady state by looking at the slope of the cumulative loss line which EMA argued is significantly more robust than the two data requirement proposed. For low permeation rates that challenge the precision of the balance employed, EMA recommended that it should be left to the discretion of the tester to extend the test in any reasonable increment as long as the result is expressed in the proper units. EMA argued that there is no need to specify that the test be lengthened in two week increments. In addition, EMA commented that a reduced testing burden should be determined using good engineering judgment and approved by the agency on a case by case basis. EMA stated that it is presumptuous to identify technologies in the regulatory context without the ability to allow equally effective technologies to be granted similar relief.

California ARB commented that EPA should consider increasing test temperatures because, as permeation rates lower, accurate measurements become increasingly difficult. In addition, a higher test temperature would also shorten the preconditioning soak time. Newer technology increases a component's resistance to permeation, thus taking longer to reach steady-state conditions. California ARB recommended a permeation test temperature of 40°C.

OPEI commented that California ARB and EPA test procedures use different test temperatures. OPEI requested that EPA and California ARB harmonize on a complete test procedure or that EPA accept California ARB test data (corrected for temperature) as proof of compliance. In conjunction, OPEI commented that any EPA testing should use the same procedures as that used for certification.

EMA commented that the required readability of 0.1 g or better is not feasible for testing larger tanks due to total scale capacity requirements. Promens expressed concern whether the weight change, due to permeation, for very large fuel tanks could be accurately measured. Promens stated that, in the case of the 50 gallon tank, there would only be a 3/100 of a percent change in weight and in the case of the 100 gallon tank, there would only be just over a 25/1000 of a percent change in weight.

HH&A commented that permeation mass measurements using ethanol containing fuels will produce different results if determined by the weight loss method and compared to the current SHED procedure. The issue here is that if one tests for permeation using a SHED, and uses the Federal calculations for mass emissions found in 40 CFR §86.143-96, the ethanol fraction of the permeate is reported as "equivalent gasoline." The equivalent gasoline deletes the oxygen mass and lowers the hydrogen/carbon fraction from 3 to 2.3, both resulting in a lower than real mass calculation. As a result, if the SHED mass emissions measurement is compared to a gravimetric (weight loss) measurement, the SHED value will under-report the true value.

HH&A recommended a revision to the SHED mass calculation where the ethanol contribution to permeation would be measured separately. A Flame Ionization Detector would be used to measures total hydrocarbons. This reading would then be corrected by subtracting the concentration of ethanol measured by the gas chromatograph (GC). This corrected reading would be used to compute non-ethanol hydrocarbon mass emissions. To this value you would add the ethanol concentration converted to mass using the true mass of the ethanol molecule.

EMA stated that the NPRM directs the tester to close the door and "record the time" when the enclosure is closed at the beginning of the weight loss test. However, EMA recommended that both the time and date should be recorded.

Letters:

Commenter	Document #
California ARB	0682
EMA	0691
OPEI	0675
HH&A	0640
Promens (hearing)	0642

Our Response:

We agree with commenters that making daily recordings of the fuel tank weight is consistent with good engineering practices. These daily mass measurements can be used to determine the stability of the permeation rate of the fuel tank and can help identify if anything unusual is occurring during the test such as a lost seal during testing. The test procedures in TP-901 require that the weight loss test continue until the correlation coefficient (r^2), from a plot of the cumulative daily weight loss versus time for 10 consecutive 24-hour cycles, is 95 percent or greater. We believe this approach gives testing facilities flexibility for basing the length of the test on good engineering judgment rather than a fixed time period. Therefore, we are adopting this general method of using daily measurements to determine the length of the test, with one modification. The California ARB method would require test facilities to make measurements over at least one weekend. We believe that weight loss measurements can be suspended for short periods of time without a negative impact on the test. Therefore, we do not require that the 11 weight loss measurements (including the 0-hour measurement) be on consecutive days provided that measurements are made on at least five different days of any given seven day period of the test. Measurements must be made at roughly the same time on each test day.

We are also adopting the sensitivity requirements for the weight loss measurements specified in TP-901. For mass measurements more than 6200 grams, the sensitivity of the balance remains at 0.1 grams, as proposed. However, for smaller tanks, more sensitive equipment is needed to accurately measure the permeation using the weight loss method. In the data collection for this rulemaking, for instance, a balance with a sensitivity of 0.001 grams was used for fuel tanks less than 1000 grams. Therefore, we are specifying a minimum sensitivity of the balance of 0.01 grams for mass measurements between 1000 and 6200 grams and 0.001 grams for mass measurements less than 1000 grams.

At this time, it appears that required readability of 0.1 grams or better is not feasible for mass measurements larger than roughly 35 kilograms due to total scale capacity requirements. However, a fuel tank within this weight limit may be used to represent a family of larger fuel tanks provided that the smaller fuel tank represents a "worst case" configuration for that family. In addition, manufacturers may request the use of other procedures provided that these procedures are equivalent or more accurate than the primary test procedures or if it can be demonstrated that the use of the alternate test procedure would not affect the ability to demonstrate compliance. In the case of SHED testing, the manufacturer would need to demonstrate that it is correctly accounting for the ethanol content in the fuel. One approach may be to use a procedure similar to that described above in the HH&A comments.

We modified the test procedures to specify that the date should also be recorded when the enclosure is closed or at other steps when the time is recorded.

4.8.8 Fuel tank permeation– other

What Commenters Said:

Honda requested clarification on §1060.520(b)(5)(i) and (ii), asking if this test is necessary, specifically related to when the fill pipe / hose is part of the tank test, tested as a separate part required to meet a 15 gram standard, or simply not covered because it does not contain liquid fuel. In addition, Honda requested clarification as to why the fuel cap would need to meet a permeation standard at the top of a 12 inch or longer fill pipe / hose when, like the fuel fill, it is not exposed to liquid fuel. Promens commented that this provision complicated the fuel tank testing and recommended that fuel caps should not be tested as part of the fuel tank unless the cap is directly part of the tank either by threads or mechanical attachment.

Yamaha noted that the requirement in §1060.520(b)(5)(i) of the proposal it indicates that filler necks that are under 6 inches above the top of the tank be tested with the filler cap as part of the tank system. Yamaha commented that this 6 inch requirement will unfairly target low gunwale height (small) boats and low profile bass boat designs with small installed fuel tanks. Yamaha argued that EPA has not made any demonstration as to the need of the 6 inch minimum requirement in or prior to this proposal and that this 6 inch criteria will cause all builders of small gunwale height boats a great expense for testing or design changes for no emission reduction gains. Yamaha requested that the 6 inch minimum height be removed from the test requirement for compliance testing of the fuel tank.

EMA commented that the reference to dry sand in the reference tank should be replaced with glass bead because sand is known to adsorb moisture and may not be appropriate. MIC commented that because the intent of this subsection describing the reference tank is to deal with changes in “buoyancy” caused by changes in atmospheric pressure, the same correction could be accomplished mathematically based on the difference in air density measurements between tests. MIC argued that this would avoid the cost and space required to prepare and store reference tanks. MIC recommended the addition of a new subsection stating that, as an alternative, manufacturers may calculate the weight change associated with the permeation test run without the use of the reference tank method by determining the air density (from barometric pressure) during the initial weighing of the sealed test tank under 1060.520(d)(1), using the measured value as $M_{initial}$, and then replacing the procedure described in 1060.520(d)(7) with a determination of M_{final} from the buoyancy-corrected weight for the sealed test tank calculated based on the change in air density between the initial and final measurements and the known volume displaced by the tank.

OPEI noted that 1060.520(b)(5) allows non-fuel cap openings to be sealed with non-permeable coverings or methods. OPEI recommended that an allowance should be made to not have the openings machined into the tank for permeation testing because this would be easier for testing and would only produce insignificantly higher permeation rates when compared to non-permeable sealing methods. OPEI specifically recommended that grommets not be considered to be part of the fuel tank. OPEI stated that this would harmonize with California ARB’s TP-901and requested that EPA add California ARB language from TP-901 in this regard.

California ARB commented proposed permeation test procedure and standards for tanks may exclude emissions from fittings, fuel pickup tubes, and fill caps. California ARB recommended that we adopt a diurnal test procedure that measures permeation, evaporation, and liquid leaks. During emissions inventory development testing, California ARB conducted diurnal testing to check the integrity of the tank components in addition to permeation barriers. California ARB reported that the data shows significant sources of evaporative emissions from components in addition to permeation.

OPEI commented that 1060.520(d)(10) has a typo in the last sentence. It currently reads “In this case, repeat the steps in paragraphs (b) (8)…” It should read “In this case, repeat the steps in paragraphs (d) (8)…" EMA commented that the reference, in §1060.521(c), to §1060.520 is not adequate because several aspects of §1060.520 are not applicable. EMA commented that the specific reference should be to §1060.520(d).

Letters:

Commenter	Document #
MIC	0701
Yamaha	0721
California ARB	0682
EMA	0691
OPEI	0675
Honda	0705
Promens (hearing)	0642

Our Response:

The general purpose of §1060.520(b)(5)(i) and (ii) is to describe how the fill inlet must be sealed for a tank permeation test. We are simplifying this requirement to state that, if the fuel cap is not directly mounted on the fuel tank, then the opening may be sealed with a non-permeable covering. We are concerned that the fuel tank manufacturer may not necessarily be aware of the configuration of the fill neck once it is installed in a marine vessel or piece of equipment. If the fuel cap is mounted directly on the fuel tank, we consider it to be part of the fuel tank and that it should be included in the fuel tank permeation test. We do allow alternatives to installing the cap on the tank during the test, including separate permeation testing of the fuel cap and the use of a default value for fuel cap permeation.

Based on the concern that sand may adsorb moisture, we are changing the regulation to refer to glass bead rather than dry sand for use inside of the reference fuel tank. We believe that an actual weight measurement on the reference fuel tank is the most direct and accurate method for correcting for buoyancy effects that may occur during testing. In addition, the reference tank inherently corrects for changes in humidity that may affect the amount of water absorbed by the fuel tank. Therefore, we are not including a buoyancy correction calculation as an alternative.

To simplify the test procedures, we are specifically excluding grommets from the fuel tank permeation testing. In this case, and for hose connections, the manufacturer has the option of simply not drilling the opening as an alternative to sealing the opening with an impermeable plug. Fuel caps, and other components mounted directly on the fuel tank, are included under the permeation standard. We are concerned that requiring a diurnal test procedure would add significant complexity and cost to the tank permeation testing without a significant environmental benefit. This is especially true for fuel tanks that are not pressurized in-use and have fittings that are not designed to withstand the tank pressures that may occur during the test.

The incorrect reference (in §1060.520(d)(10)) to paragraphs (b)(8) through (9) has been removed. The reference (in §1060.521(c)) to §1060.520 is correct. A reference specifically to §1060.520(d) would unintentionally exclude the preconditioning fuel soak.

4.8.9 Diurnal

What Commenters Said:

Honda noted that §1060.525(a)(5) proposes that the test of a canister should begin with the canister at full working capacity, exposure of the canister to one diurnal cycle and then initiation of the test. Honda commented that this test will not be representative of some canisters that will not reach full saturation under normal diurnal conditions. Honda argued that this is an issue of concern for both small engines and marine engines and suggested that this issue needs further, more in-depth evaluation.

California ARB commented that the proposed diurnal temperature profile may not be stringent enough to replicate the higher temperatures that commonly occur in California and other Southwestern states. Because many marine spark-ignition vessels spend the majority of time exposed to the sun, California ARB expects that fuel temperatures will likely exceed the proposed 25.6ºC to 32.2ºC fuel temperature profile. California ARB commented that a temperature profile of 65 to 105 degrees Fahrenheit (ºF) seems more appropriate for California and is currently evaluating the diurnal temperature profile. California ARB requested that EPA adjust the proposed temperature profile when the data becomes available.

California ARB commented that the proposal to fill the fuel tanks to 40 percent capacity is not consistent with the California established procedure of filling the fuel tanks to 50 percent capacity for diurnal testing. For harmonization, California ARB recommended that EPA should either modify the test procedure to require that fuel tanks be filled to 50 percent capacity or to allow California testing to meet the proposed EPA requirements.

California ARB commented that the proposed three-day diurnal cycle for measuring emissions from marine vessel tanks configured with carbon canisters may not be long enough to determine canister stability. California ARB recommended a seven-day diurnal cycle to ensure canister stability.

EMA commented that the ASTM method cannot be used for measurement of butane working capacity in a carbon canister because the method requires a specific shaped test vessel, a specific amount of carbon, and temperature controlled water bath. EMA argued that the ASTM method should not be referenced except when specifically defining the bulk characteristics of the carbon itself. EMA recommended that the Butane Working Capacity be determined using the procedure defined in ARB TP-902 Appendix A.

Delphi stated that it agrees with the proposed diurnal fuel temperatures for the fuel tanks, but suggested that there may be challenges associated with running the proposed test procedure. Delphi stated that breakthrough amounts may exceed limits of a typical SHED flame-ionization detector. Therefore, a purged slave canister would need to be weighed and connected to the air inlet of the test canister to measure breakthrough amount. By having the slave canister outside the SHED, the permeation of the fuel tank would not contribute to the diurnal emissions. Delphi stated that the slave canister may need to be manually changed to allow back purging of test canister; otherwise, complicated valving and switching is required. Delphi also noted that the

SHED ambient temperature needs to be controlled based on fuel temperature which is different from typical automotive testing where SHED temperature is controlled as a function of ambient temperature in the SHED.

Letters:

Commenter	Document #
Honda	0705
California ARB	0682
EMA	0691
Delphi	0638

Our Response:

It is not clear why Honda believes that a carbon canister on a marine vessel may not reach saturation under normal diurnal conditions. It is common for marine vessels to remain unused for extended periods of time. Therefore, effects such as active purge or fuel draw down in the tank, which require engine operation, cannot be relied on to purge the canister regularly at short intervals. Data in the RIA show that passively-purged carbon canisters subject to a multi-day diurnal cycle eventually reach saturation. A large enough canister to never reach saturation would be cost-prohibitive and too large for most marine applications. Therefore, we believe that the carbon canister must begin loaded and then subjected to a passive purge cycle prior to performing diurnal emission measurements.

The temperature profile for marine fuel tanks is based on the same ambient temperature profile used, in EPA test procedures, for automotive applications. It is reasonable to expect that boats would experience similar summer day temperatures as cars and trucks. As demonstrated by data in the RIA, fuel temperatures profiles in marine fuel tanks typically have less variation than ambient air temperature due to inherent insulation of the fuel tank in the boat, influence of water temperature (for boats stored in the water), and thermal inertial of the fuel (especially in larger fuel tanks). As a result we based the diurnal test temperatures on fuel temperature and adjusted for the above effects.

It should be kept in mind that the test procedure is a combination of different parameters that affect the measured diurnal emission rate. These variables include fuel specifications and fill level as well as the temperature profile. The diurnal emission standards are based on measured emissions using the emission test procedures established in this rule. If the test parameters were to be changed, the numerical level of the standards would need to be adjusted as well to achieve the same stringency. In the event that California ARB develops a diurnal test procedure for marine vessels, we would need to consider all of the above test parameters before determining if data collected on that future test cycle will be acceptable for certification to the EPA standard. To the extent that there are differences in test procedures, we would need to approve those changes under §1060.505(c).

We believe the diurnal test procedures are appropriate for demonstrating the in-use control capability of anticipated emission control technologies. An overly high temperature profile could cause poor test results for a given control technology, such as sealed tanks with pressure relief, even though this given control technology would be expected to achieve significant emission reductions in use. The fill level and test fuel specifications are based on those used today for automotive testing, and we believe these parameters are also representative of in-use conditions for marine vessels.

We have not seen evidence that a seven-day diurnal cycle would ensure canister stability. In our test procedure, the canister begins in a loaded condition then a single passive purge event is run. Data in the RIA suggests that, once these conditions have been achieved, that a relatively stable emissions profile is achieved. We believe that a seven day test would be overly burdensome without providing significant additional useful information. We do recognize that additional diurnal cycles may be warranted for control strategies that depend on regular engine operation such as designs that are based on active purge, or even running loss conditions. This may be appropriate for equipment types that are used more regularly than marine vessels.

We agree with EMA that ASTM D5228-92 is intended for determining carbon working capacity rather than canister working capacity and is therefore not an appropriate method for loading a canister prior to a diurnal emission test. As a result, the diurnal emission test procedures have been revised to include a canister loading procedure, for marine applications, based on the method in TP-902 for small off-road equipment.

Delphi commented that the diurnal emissions from marine fuel tanks may be too high to be measured by standard equipment in existing SHEDs and suggested an alternative procedure based on the use of a slave canister. It should be noted that the diurnal emission data presented in the RIA for marine fuel tanks was based on SHED testing with a flame-ionization detector. In the event that a manufacturer was not able to perform the test procedure in the regulations, they would be able to request EPA approval of an alternative method provided that this method is equivalent to the primary method.

4.8.10 Running Losses (temperature measurement)

What Commenters Said:

EMA commented that, for running loss testing, the fuel tank temperature must be stabilized prior to running the test such that fuel stabilization is not inadvertently included in the measured result. However, EMA argued that the requirement that the fuel in the tank be within 2°C of (but not exceeding) the ambient temperature is overly prescriptive. EMA recommended that the requirement be revised to indicate the use of good engineering judgment to determine that the fuel temperature in the tank has stabilized, with the caveat that the measured temperature rise cannot be adjusted to account for perceived changes due to stabilization. In addition, EMA commented that fuel temperature in the tank that is not a result of engine operation, such as sun heat loading, should not be included in the temperature rise associated with determination of running loss control. If, using good engineering judgment, EMA stated that a manufacturer can demonstrate the fuel tank temperature variation associated with conditions other than running the engine these variations should be allowed to be deleted from the running loss temperature rise assessment.

EMA argued that the proposed testing conditions are not viable and do not represent the appropriate measure of fuel tank temperature change associated with running the engine. According to EMA, the set of conditions needed to run an outdoor running loss test are unacceptably limiting, large portions of the year will not meet the combinations of conditions, and the number of days that can be used for testing will be severely limited. Specifically, EMA recommended that the maximum acceptable cloud cover specified in §1060.535(a)(3)(iv) should be deleted in its entirety.

EMA requested that the final rule include the option to use a laboratory test procedure, stating that a lab test would be more repeatable and less subject to variation due to ambient conditions. Additionally, EMA commented that these procedures should include an option to record the fuel temperature of an equivalent unit exposed to the same ambient conditions but without the engine running. The reported temperature rise would be the difference between the temperature of the running unit and the non-running unit. EMA commented that the requirement to include solar loading in the determination of an equivalent indoor test is not appropriate, and that temperature rise criteria should not include effects that are not related to engine operation, such as solar loading.

Letters:

Commenter	Document #
EMA	0691

Our Response:

As discussed above, we are not finalizing an option to comply with the running loss standard by demonstrating that only a minimum fuel temperature rise occurs during engine operation. Therefore, the above comments are not relevant because we are not finalizing a test procedure for measuring fuel temperature changes during engine operation.

4.8.11 Diffusion

What Commenters Said:

EMA commented that there is no need for a specific requirement related to diffusion emission controls and therefore no need for a procedure to test diffusion emissions. However, in the case that a diffusion test is required, EMA made the following recommendations:

- Manufacturers also should have the option to test using the gasoline specified for testing in 40 CFR Part 1060.501. The option to test with the gasoline specified in §1060.501 would allow the manufacturer to conduct diffusion testing with the same stabilized fuel tank utilized for permeation testing.
- The requirement to use a fully loaded canister attached to the fuel tank in a way that represents a typical in-use configuration is not appropriate. No testing was performed during the development of the NPRM with a carbon canister, and the implications of the canister loading are not clear. We recommend the test be conducted with a fully purged canister or, at the maximum, a 50% filled canister. In addition, California ARB's TP-902 method should be used to determine canister working capacity.

- The length of the "stabilization period" must be defined. EMA recommends that the stabilization period definition require that both the liquid fuel and enclosure temperature should be maintained at the specified temperature range for 30 minutes. While required for accurate testing, purging the SHED introduces fresh air to the enclosure that is not at the specified temperature. A re-stabilization of the SHED and liquid fuel temperature after purging for at least 15 minutes should be included.
- The requirement to collect emission measurements for 6 hours is overly prescriptive. EMA recommends a change to allow collection of emissions measurements for at least 6 hours but no more than 24 hours.

Letters:

Commenter	Document #
EMA	0691

Our Response:

As discussed above, we are not finalizing a diffusion standard. Therefore, the above comments on the test procedures are not relevant because we are not finalizing a diffusion test procedure.

4.9 Small business issues

What Commenters Said:

Tohatsu commented that it is quite a tough job for a small manufacturer like itself who has total employees of less than 500 people to redevelop and set calibration fuel, ignition timing, etc. and also comply with evaporation requirements. Although Tohatsu understands that these requirements are necessary, they noted that it is a very time consuming, and expensive, process for a small company to meet. Tohatsu commented that the time frame should be extended as much as possible to give small manufacturers a realistic chance to comply with the new regulations. Unlike many of their competitors that have other divisions in cars and motorcycles, Tohatsu produces only outboards. Because of this, Tohatsu commented that it does not have the same resources to be able to comply with new regulations as quickly as other companies.

Premier Marine commented that the diurnal system requires a pressurized fuel system and they would be very cautious regarding the safety of this technology for use in the marine market and could lead to possible hazardous conditions. As a small business, they commented that they do not have the resources to engineer and test the proposed canisters. It will be very costly to implement and they would need more time to implement the change.

NMMA noted that EPA acknowledges the challenges faced by the small boat builders and requested comment on a three-year phase-in (33-66-100 percent) for the diurnal emission standards over model years 2010-2012. NMMA commented that a phase-in approach is not practicable for boat builders. Instead, NMMA supported an additional two years of lead time for compliance, i.e., until model year 2013, for small businesses to allow for sufficient time for these business to gain experience with carbon canisters. NMMA commented that small businesses with 500 employees or less should be eligible for this relief. NMMA also supported additional lead time so that ABYC could work on standard practices for canisters and address possible pressurization issues.

Grady-White Boats provided comments to EPA after the close of the comment period on a phase-in of the diurnal emission standards for small manufacturers. Grady-White noted that they are convinced that the fairest method to implement the diurnal controls is on a percentage basis. This treats all boat builders on an equal basis and does not create competitive advantages or disadvantages for anyone.

To demonstrate the inequities created by an allowance system, Grady-White suggested EPA consider a comparison of a low volume builder of a larger sized boat to a high volume builder of a small model boat. Both builders have total wholesale dollar sales of $50 million a year. Builder A builds an 18' center console model that wholesales for $19,000. This requires sales of 2,632 units to make the $50 million in sales. Production level would be about 50 boats a week. Under an allowance system discussed by the EPA this builder has to install diurnal controls on 1,832 boats the first year. Builder B builds a 33' boat that wholesales for $259,000. This requires 193 boats to get annual sales of $50 million. Production would be about 3.7 units per week. Under the allowance system discussed by EPA the builder would not have to install controls on any boats until the last year of the phase-in period.

Grady-White noted that the two companies of equal sales figures are treated completely different regarding the impact of the diurnal control phase-in allowance. This is clearly unfair to the one builder. A straight percentage based approach as recommended by NMMA (30/60/100) treats both the above businesses fairly and equally. In the above example, both builders have only one model upon which to engineer the changes. The engineering cost will be 100% in the first year for builder A while builder B can spread the re-engineering cost over a three year period.

Grady-White noted that they have also struggled to understand the EPA's perspective from the compliance/enforcement side. If a builder has to keep records to prove compliance on a percentage basis, or on an allowance basis, there seems to be no difference. The builder will have to maintain these records and be able to produce them upon the request of the EPA. The boats can be clearly labeled as within the percentage required to have controls as easily as they can be labeled as within the allowance. They fail to understand how the percentage proposal requirement places any additional burden upon the EPA.

Grady-White Boats also commented on the impact and challenges the proposed rule creates for small businesses. They commented that the rule creates many demands for re-engineering, paperwork, record keeping and cost increases for our customers. They believe it is vital to keep the new requirements from becoming a paperwork and reporting nightmare for the small businesses that are the backbone of the boat building industry. Grady White highlighted the engineering resource burden to redesign and/or modify existing tooling to accept canisters and estimated that 100 man hours per model will be needed to design, prototype, train production associates, and document the fuel system changes on each model. The builders commented that small businesses do not have the engineering stuff to handle these extra demands in such a short time.

NMMA noted that it is conducting outreach to the boat building community to ensure that all affected businesses are aware of the new regulation and its implications. NMMA urged EPA to work with the SBA to develop a schedule for workshops across the country to ensure that small businesses understand the requirements of the standards and the implementation dates.

ABYC noted one concern it shares with NMMA is the education of the non-NMMA builders. The US Coast Guard has a database with over 4,000 registered boatbuilders. ABYC is geared toward all builders with the ultimate goal of safer product on the water. With its 15 year track record of educating and certifying personnel to our standards, ABYC commented that it will be a crucial asset for educating the approximately 3,600 builders that remain uncertified by the NMMA. ABYC noted that with the proper funding, it can help educate boatbuilders, on a much broader scale, to the upcoming EPA requirements as well as ways to make a boat safer.

Letters:

Commenter	Document #
Tohatsu (hearing)	0642
Premier Maine Inc.	0613
NMMA	0688
ABYC (hearing)	0642
Grady-White Boats	0677
NMMA	0739
Grady-White	0750

Our Response:

With respect to the comments on additional time for small manufacturers to meet the evaporative standards, it can be noted that EPA is delaying implementation of a number of the evaporative emission standards for all manufacturers. EPA is delaying implementation of certain hose requirements originally scheduled for implementation in 2009. The requirements contained in the final rule for under cowl hose will be phased in between 2010 and 2015, and the primer bulb will have until 2011 to comply. In addition, EPA is delaying the diurnal requirements which were proposed for 2009 for portable tanks and PWCs until 2010. In addition, EPA is delaying implementation until July 31, 2011 for other installed tanks, with a 50 percent phase-in requirement for the first year. As noted below, EPA is also adopting a diurnal allowance program for small-volume boat builders as an alternative to the phase-in. EPA believes these delays will provide sufficient lead time for all manufacturers to comply, whether large or small. (See Section 4.3 of this document for further discussion of the feasibility and lead time for the evaporative emission standards for Marine SI engines and vessels.)

As noted above, manufacturers expressed concern that many small boat builders may need additional time to develop installation procedures and install carbon canisters in their boats. To address this, we are establishing an interim diurnal allowance program that will give additional time for small-volume manufacturers for a certain number of boats during the first two years of the program. Under this program, each small-volume boat builder will be allowed to sell these boats without the diurnal emission controls that would otherwise be required. This allowance program applies only to boats with installed fuel tanks that are expected to use carbon canisters to meet the diurnal emission standards. Therefore, it does not apply to portable fuel tanks or personal watercraft. If the small-volume boat builder chooses to use this allowance provision, then the 50 percent phase-in for the first year, as noted above, would not apply. Each small-volume boat builder will have a total of 1,200 allowances that may be used, at the manufacturer's discretion, for boats produced from July 31, 2011 through July 31, 2013. For instance, a small manufacturer could produce 800 boats in the first year and 400 in the second year without diurnal emission controls. For most small-volume boat builders, we expect that this allowance program will result in an additional year or two of lead time for them to address potential installation issues related to carbon canisters.

In response to the comments on conducting outreach to boat builders, EPA agrees that such a process is important to ensuring the success of implementing the new requirements. With potentially thousands of boat builders, it will be necessary to use a variety of methods to make sure that all affected manufacturers are aware of the new requirements. EPA expects to explore working with all interested parties, including trade organizations and other government agencies, to educate boat builders on the requirements that will come into effect as a result of the new evaporative emission standards for marine engines and vessels.

With regard to the comments on the amount of paperwork and reporting required under the new standards, EPA has designed the program in a way that allows boat builders that use certified components (i.e., hose, tanks, and diurnal systems) to not have to certify with EPA at all. This would be synonymous with the current program in which boat builders that use certified engines have no requirement to submit any information to EPA. If a boat builder chooses to certify its own fuel line, fuel tank, or diurnal system, they will be required to certify with EPA and submit all of the information required as part of that process. However, EPA expects that most boat builders will purchase certified components, allowing them to avoid submitting any information to EPA. Boat builders participating in the ABT program for fuel tanks would also be required to certify with EPA. Because participation in the ABT program is voluntary, only those boat builders choosing to earn or use credits for their boats would need to certify with EPA.

4.10 Other issues

Comment	Response
OPEI commented on §1060.301 that more detail is required from EPA as to what is acceptable QA data. OPEI noted, for example, thickness checks, FTIR data, iodine checks for coextruded and asked what level of data would be acceptable to EPA. Similarly, EMA commented on §1060.301, saying that the section is vague, and should include examples of expected testing such as the following: "For example, you must conduct production quality testing in order to confirm barrier layer thickness or materials utilized are as specified."	We believe it is most appropriate to rely on broad language requiring manufacturers to perform quality-assurance procedures relative to the evaporative emission standards without requiring specific measurements, sampling rates, or other detailed specifications. We would expect all manufacturers to take steps today to ensure that their products meet certain quality and performance specifications. We simply want manufacturers to use good engineering judgment to factor emissions compliance into their

	ongoing effort to ensure quality production. This might involve emission measurements, but it may alternatively involve a series of measurements and inspections not directly related to the applicable emission standard.
NMMA and Mercury Marine noted that EPA's preamble states that manufacturers will not be required to perform in-use testing or production-line testing for evaporative emission standards. However, EPA then states that "we may pursue testing of certified products to evaluate compliance with evaporative emissions standards" and includes proposed §1060.301. This section requires manufacturers to "test production samples or otherwise verify that equipment or components . . . are as specified in the certificate of conformity." (as proposed in §1060.301(a)). NMMA and Mercury Marine commented that the inclusion of this provision not only contradicts EPA's statement in the preamble but it also seems inconsistent with the design-based certification option. Given that EPA can always use the SEA program, NMMA and Mercury Marine recommended that EPA delete this provision from the rule.	We are not adopting specific requirements for in-use testing or production-line testing for evaporative emission standards. This contrasts with outboard and personal watercraft engines where we have adopted requirements for both of these types of testing. The Clean Air Act allows us to do any amount of testing to confirm that certified products meet applicable standards. Without routine testing after certification from manufacturers, we may find the need to do some of this testing ourselves. As described under the preceding comment, the provision requiring evaluation of production samples is intended to require broadly that the manufacturers take steps to ensure that their products are meeting quality specifications for emission-related compliance at the same time that they are evaluating these components for other purposes.
Honda recommended that we clarify the design-based certification options in §1060.240 to emphasize that any of the listed technologies are acceptable for certification (not all of them).	We agree with the comment and have changed the regulation accordingly.
OPEI supported the provisions as stated by EPA to align exemptions for both exhaust and evaporative requirements for the same product. The exemptions for evaporative requirements must be for products where the exhaust requirements have already been exempted for the reasons stated within the provision. Equipment manufacturers may need to apply for exemptions for equipment that includes new evaporative emission control technology but does not include new exhaust emission technology. As such, a program to allow for exemptions associated with evaporative only provisions independent of the engine manufacturer must be allowed.	We understand this comment as supporting the proposed approach. We are finalizing these provisions as proposed.
EMA noted that equipment manufacturers may need to apply for exemptions for equipment that include new evaporative emission control technology, but does not include new exhaust emission technology. As such, EMA commented that a program to allow for exemptions associated with evaporative only provisions independent of the engine manufacturer must be included in the final regulation.	We specifically proposed that the testing exemption is one of those cases where manufacturers may need an exemption from evaporative requirements even though the engine would not be exempted from exhaust emission standards. We are therefore adopting the regulatory language as proposed.
OPEI commented that EPA should clarify §1060.201. OPEI noted that the certificate of conformity will list an effective date (signature date). The manufacturer may not introduce into commerce before this date but may produce equipment/engines prior to the effective date.	We are adopting provisions in §1068.103 to clarify that manufacturers may produce engines or fuel-system components after submitting an application for certification, subject to certain conditions. This is consistent with longstanding practice.
The Massachusetts Marine Trade Association commented that the recreational marine industry is staggering due to several recent mandates by EPA. They cited damage to boat engines due to the addition of ethanol to gasoline, loss of engine system lubricity due	We have made great efforts to address NMMA's concerns with the regulations, as described throughout this document.

to introduction of ultra low sulfur diesel fuel, permitting of tens of millions of boats due to incidental discharges, and ongoing expenses and regulations imposed on small marinas and boatyards to come into compliance with the Clean Water Act and the Resource Conservation and Recovery Act. The Massachusetts Marine Trade Association requested that EPA work with NMMA to implement the new regulations.	
EMA commented that the combination of engine and equipment requirements as currently set forth in Part 1054 is confusing to the regulated parties. In order to address this issue, EMA commented that §1054.20(a), (c), and (d) should be deleted and §1054.20(b) should be revised to state "All equipment utilizing engines subject to the exhaust standards of this part must meet the evaporative standards of 40 CFR Part 1060.	We believe this section, including the offending paragraphs, provides a useful summary for equipment manufacturers who might be reading part 1054. (This might often occur since these companies in many cases also certify with respect to exhaust emissions.) These paragraphs also allow us to clarify what provisions apply for fuel systems used with marine vessels or motor vehicles.
EMA commented that §1054.110 is confusing and must be clarified. While the introductory paragraph indicates that this section provides standards applicable to handheld engines, §1054.110(c) and (d) specifically state that they are applicable to non-handheld equipment. In order to avoid confusion, EMA commented that the handheld provisions should be segregated from the non-handheld provisions. Accordingly, the references to 40 CFR Part 1060 that apply to each industry could be more clearly identified.	We agree with this suggestion and have revised the final rule accordingly.
EMA commented on "Are there interim provisions that apply only for a limited time?" EMA commented that §1054.145(d) and (e) pertain exclusively to nonhandheld non-integrated equipment manufacturers and therefore appear to be misplaced. EMA commented that these paragraphs should be deleted in their entirety.	Since part 1060 applies broadly to different categories of nonroad equipment, it would also be very confusing to move these provisions to part 1060. Since the provisions related to emission credits are already in part 1054, we believe it is quite appropriate to place these provisions for equipment manufacturers in part 1054. Moreover, in many cases equipment manufacturers also certify with respect to exhaust emissions, so placing these provisions in part 1054 should involve a minimum of confusion.
EMA commented that §1060.202(a) and (b) appear to contain a typographical error. The word "through" should be deleted and replaced with "….standards specified in §1060.105, …" in both paragraphs.	We agree that the text was not correct. The proper wording is "§§1060.102 through §1060.105."
EMA commented that §1060.240 is incomplete. Part 1060 includes requirements for running loss controls and diffusion controls that are not included in the NPRM, but are nonetheless required. EMA recommended that EPA develop a table outlining the requirements for the different regulated industry segments, as defined in §1060.1, and defining the demonstration requirements for each control element required.	We have attempted to lay out the full set of requirements and responsibilities for different manufacturers in §1060.1 and §1060.5. We did not attempt to use §1060.240 to define design-based certification options for every standard and every technology. The list of technologies in §1060.240 is narrowly limited to those things that qualify for consideration under design-based certification.
EMA commented on §1060.250(b) that the requirement to retain data from routine emission tests for one year while retaining all other related test information for eight years is not appropriate. EMA commented that if records are required for eight years, all of the related information should be retained for the same time period. Information that is not related to the prescribed testing requirement should not be required to be retained	If manufacturers are unable to manage recordkeeping according to multiple schedules, they should keep all their records for eight years. We believe this is not sufficient justification to require all manufacturers to keep routine testing records for eight years. We have revised the regulation to clarify the recordkeeping requirements related to routine testing information.

because it is not required to be recorded initially.	
EMA commented on §1060.401 that EPA should clarify for any in-use testing that may be performed that they will use the same test procedure and fuel as that specified by the manufacturer at the time of certification.	This is not correct. EPA will generally use the fuel specified in the regulation for any particular test. If manufacturers use an approved alternate fuel, we may optionally test with the specified test fuel or the alternate fuel.

Letters:

Commenter	Document #
OPEI	0675
Massachusetts Marine Trade Association	0634
EMA	0691
Honda	0705
NMMA	0688
Mercury Marine	0693